W.S.S.
WAR SAVINGS STAMPS
ISSUED BY THE
UNITED STATES
GOVERNMENT

NEW ORLEANS MEDICAL AND SURGICAL JOURNAL

EDITORS:
CHARLES CHASSAIGNAC, M. D. ISADORE DYER, M. D.
COLLABORATORS:
C. C. BASS, M. D., Prest., Amer. Soc. Tropical Medicine.....
S. K. SIMON, M. D., Acting Secty, American Soc. of Tropical Medicine..... } *Ex Officio*
P. T. TALBOT, M. D., Secretary Louisiana State Medical Society..... *Ex-Officio.*
RUPERT BLUE, M. D., Surgeon General, United States Public Health Service.
H. D. BRUNS, M. D., Tulane University of Louisiana.
C. F. CRAIG, M. D., Col., U. S. A.
S. T. DARLING, M. D., Sao Paulo, Brazil.
W. H. DEADERICK, M. D., Hot Springs, Arkansas.
E. M. DUPAQUIER, M. D. (Paris), Tulane University of Louisiana.
A. G. FRIEDRICHS, M. D., New Orleans, La.
J. T. HALSEY, M. D., Tulane University of Louisiana.
JOS. HOLT, M. D., New Orleans, La.
F. A. LARUE, M. D., Tulane University of Louisiana.
E. S. LEWIS, M. D., Tulane University of Louisiana.
R. C. LYNCH, M. D., Tulane University of Louisiana.
E. D. MARTIN, M. D., Tulane University of Louisiana.
R. MATAS, M. D., Tulane University of Louisiana.
AUGUSTUS McSHANE, M. D., Greenwood, Miss.
PAUL MICHINARD, M. D., Tulane University of Louisiana.
C. J. MILLER, M. D., Tulane University of Louisiana.
F. W. PARHAM, M. D., Tulane University of Louisiana.
E. A. ROBIN, M. D., Tulane University of Louisiana.
W. H. SEEMANN, M. D., Tulane University of Louisiana.
ALLEN J. SMITH, M. D., University of Pennsylvania.
EDMOND SOUCHON, M. D., Tulane University of Louisiana.
E. R. STITT, M. D., Rear Admiral, U. S. N.
J. A. STORCK, M. D., Tulane University of Louisiana.
R. P. STRONG, M. D., Harvard University.
ROY M. VAN WART, M. D., Tulane University of Louisiana.

Vol. LXXI AUGUST, 1918 No. 2

EDITORIAL

ARMY SCHOOL OF NURSING.

The large demand for medical officers for the army has had a certain corollary in the need of trained nurses, and the loyal response of the patriotic women in this calling has been significant. Various suggestions have been made for meeting the civil need, such as the resumption of nursing by those who have married, and by providing partially trained nurses in the emergency.

With the same foresight which has characterized so much of the activities of the Medical Department of the Army, a regular plan for training nurses for military needs has been put in operation. The Army School of Nursing has been established by the Surgeon General, under the Medical Department of the Army, and it offers

a thorough course in nursing to women desiring to care for the sick and wounded soldiers. The course will be systematic, and a diploma will be awarded at the completion of the course. The training is to be given at the military hospitals, and a three years' course of instruction is outlined. Credit of three to nine months will be given applicants with college education. Each hospital employed for training will have its corps of teachers.

The outline of work provides a probationary period of four months, eight months of junior work and twelve months each in intermediate and senior classes. An allowance of $15 a month is allowed for necessary expenses, covering uniforms, etc.

The published outline of the school invites a large response from young women between 21 and 35 years of age, and especially from those who are inspired to engage in this patriotic service.

Direct information may be had by addressing the Army School of Nursing, through the Surgeon General of the Army, Washington, D. C., or, for this vicinity, the Gulf Division of the Bureau of Nursing of the American Red Cross, Postoffice Building, New Orleans.

MOBILIZATION OF PHYSICIANS.

From time to time unofficial or semi-official statements are published regarding a forthcoming mobilization of the members of the medical profession. If the term "mobilization" is used in the figurative sense, well and good, as we are firmly of the opinion that the medical profession should be utilized to the utmost. Used in any other sense, these annoouncements are both useless and of questionable taste.

The physicians of this country, all in all, have responded nobly and are as patriotic as any other body of men. They have not waited to be drafted, nor have they drawn the line at age; many volunteers have been refused for being over the age limit. That a few, here and there, have dodged their responsibility is bound to be and is admitted, but those are exceptions that prove the rule.

Movements already inaugurated will no doubt further stimulate recruiting among the physicians left, but it must not be lost sight of that already some communities and institutions are suffering for the lack of medical services.

Any really compulsory measures would be of doubtful legality.

ORIGINAL ARTICLES

(No paper published or to be published in any other medical journal will be accepted for this department. All papers must be in the hands of the Editors on the tenth day of the month preceding that in which they are expected to appear. Reprints may be had at reasonable rates if a WRITTEN order for the same accompany the paper.)

THE DIETETIC TREATMENT OF LIVER DISEASES.*

By ALLAN EUSTIS, B. S., Ph. B., M. D., New Orleans, La.

The importance of a proper diet in such conditions as present deficient liver function is manifest when one considers the frequency with which the latter is found in diseases beside cirrhosis and other primary hepatic disease.

A consideration of a few will be of interest.

GALL-BLADDER DISEASE.—In this condition there is an associated cholangitis, varying in intensity with the virulence of the infection, and certainly dependent, in part, on injudicious dieting. Further, after operations upon the gall-bladder there is always more or less cholangitis, and the importance of a proper diet in the post-operative treatment of gall-bladder cases has been urged by me for several years.

ECLAMPSIA.—The trained obstetrician regards this condition as primarily hepatic, due to central necroses in the liver lobules, and the albuminuria as only a secondary manifestation of the toxemia. However, I have found that even they make little attempt to spare the liver in their dietetic measures, while the average practitioner waits until large amounts of albumin appear, or even for convulsions, before any attempt is made to regulate the diet. I believe firmly that it is possible to avoid eclampsia by proper dietetic measures, and that the time will come when a case of eclampsia will undermine an obstetrician's reputation as much as one of puerperal sepsis. The day has passed when the obstetrician has done his full duty when he examines the urine once a week for albumin and sugar; for, by more frequent tests for indican and urobilinogen, he is in a position to determine the liver function of any case. This opinion is based upon the experience gained during my four years of rural practice in a locality where eclampsia is very prevalent. While there I was able to guide women, who had had eclampsia in previous labors, through normal parturition, without even an al-

* Read at the 39th Annual Meeting, Louisiana State Medical Society, New Orleans, April 16, 17, 18, 1918.

buminuria. Other observers have reported some interesting experimental work, which will be referred to later, in its relation to eclampsia.

Malarial Fever.—We all recognize the liver as being damaged in malaria, and calomel is as frequently administered as quinin; and yet, how many practitioners consider the diet in the treatment of malarial fever?

This same question can justly be made to include loss of cardiac compensation with secondary passive congestion of the liver; typhoid fever, in which there is always more or less hepatic degeneration, and especially the common term "biliousness," in which there is a passive congestion of the liver from overwork in detoxicating the poisons coming from the intestinal canal.

Yellow fever should also be considered a disease in which the liver should be spared on account of its fatty degeneration. A rational diet for liver diseases can be prescribed only after a thorough knowledge of the physiology of the liver and of the chemical pathology in diseased conditions of the organ.

Physiology of the Liver.

Besides the secretion of bile and the storing of glycogen in its cells, we have known for a long time that a large proportion of the amino acids in the portal blood are deaminized by the liver cells and that the liver is the principal site of urea formation. It has also been known for years that dogs with an Eck fistula (an anastomosis between the portal vein and vena cava), if fed on meat, develop a toxemia and die in a few days in coma or convulsions. Examination of the blood shows a relative decrease in the urea content and a relative increase in the ammonia content, which has led certain observers[1] to believe that the intoxication is due to an alkalosis, probably from ammonia salts. However, on the other hand, experimental and clinical data all point to a tendency to acidosis in liver insufficiency. It is more probable that, by our present methods of estimating ammonia in blood, many volatile amins are estimated as ammonia, and that the relative increase in ammonia in the portal blood and in the blood of dogs with Eck fistulæ is really due to the presence of putrefactive amins absorbed from the intestinal canal, these being broken up into urea by the normal liver. In experiments, which have never been published, I have demonstrated that the two diamins, putrescin and

cadaverin, pass over with ammonia and cannot be detected from the latter by the Folin method of determining ammonia in blood. As this method, or some modification of it, is usually employed, one can readily understand that with such volatile amins as methylamin, dimethylamin and trimethylamin arising from protein putrefaction the apparent ammonia content will be still further increased. I have endeavored for seven years to find or perfect a method for the separation of these volatile amins from ammonia, but without success, and therefore evidence, as yet, is not conclusive on this point.

These volatile amins, arising from protein putrefaction, are but slightly toxic, although capable of causing local necrosis when injected subcutaneously, according to such a well-known authority as H. Gideon Wells.[2] The higher, non-volatile amins, however, are extremely toxic, and the only explanation of their failure to manifest themselves in the normal dog or individual is that in passing through the liver they are in some way detoxicated. Certain of these detoxication processes are well known. Indol, which Herter[3] has shown to produce in man headache, irritability, insomnia and confusion, is detoxicated by the liver by oxidation to potassium indoxyl sulfate or indican. Richards and Howland[4] have claimed that this toxicity is markedly increased when conditions favoring lowered oxidation obtain. Ewins and Laidlaw[5] have further shown that paraoxyphenylethylamin, a toxic amin from the putrefaction of tyrosin, is broken up by the liver into paraoxyphenylacetic acid and urea, while I have reported elsewhere[6] experiments to prove that the liver of the turkey-buzzard, at least, contains an enzyme which is capable of detoxicating solutions of betaimidazolylethylamin, a highly toxic amin derived from the putrefaction of histidin. This detoxicating function of the liver, therefore, is its most important function, and failure thereof soon results in death, and yet we find barely a paragraph devoted to it in our text-books on physiology. No further argument is necessary to convince me that any efforts tending to relieve the liver of work should be exerted towards overcoming any tendency to absorption of protein putrefactive products.

In a paper before this Society, in 1912, I reported the results of 363 tests of urine for the presence of urobilinogen in various cases, using Ehrlich's aldehyde reagent, and at that time I stated that in each case in which urobilinogen was present the liver was clinically deficient in function.

During the past three years, in my office alone, 5,042 examinations of urine have been made, in which this reagent was used, and in each instance where a positive test was obtained the liver was found diseased. Further, by means of this test, it has been possible to accurately note the effect of intestinal poisons upon the liver. Patients giving a positive urobilinogen test, after purgation and being kept on a low protein diet, have shown a negative test for as long as two months, the urobilinogen reappearing in a few days after they are allowed to run a heavy indicanuria, the urobilinogen again disappearing, but slowly, after the intestinal toxemia is overcome.

Certain experimental data support this theory. Whipple and Sperry,[7] in their experiments on dogs in which liver necrosis was produced by chloroform, while not claiming their evidence as conclusive, reported failure to obtain the typical chloroform necrosis of the liver cells in dogs with Eck fistulæ—*i. e.*, in which the liver was not subjected directly to the influence of blood coming from the intestinal canal. In conclusion, they state:

"There are many points in favor of the view that accumulation of waste products in the blood as it flows from the edge to the center of the lobule renders the central cells more prone to injury."

Later, Opie and Alford[8] produced liver necrosis in rats by subcutaneous injections of chloroform mixed with two parts of paraffin oil. One set of rats was fed on oatmeal and cane sugar, one set on suet, and one set on meat. The animals which received carbohydrates survived, whereas those which received meat and fat died in from one to four days. They state, in closing:

"Since necrosis of the liver from chloroform in animals coincides so closely with a variety of conditions in man, namely: toxemia of pregnancy, acute yellow atrophy of the liver, etc., the foregoing experiments suggest that a carbohydrate diet may be found to influence favorably the course of these diseases, whereas fat may have grave danger."

Quite recently Lavake[9] repeated the experiments of Opie and Alford and advocates a high carbohydrate in pre-eclamptic toxemia, as he considers that the carbohydrates have a distinctly protective influence on the liver cells. In line with this, it is interesting to note that in a recent issue of the *Journal of the American Medical Association*[10] it is stated that the incidence of eclampsia has markedly decreased in Berlin since the war began, a 75 per cent reduction at the Charité and a 66 per cent reduction at the Frauen Klinik, the reduction being ascribed to the scarcity of meat.

Diet.—The diet should consist essentially of an abundance of carbohydrates, and, while a transient glycosuria may be produced, this soon disappears as the liver cells regenerate. This must be selected according to the gastric function of the patient, and, if vomiting exists, glucose by drip proctoclysis or by hypodermoclysis must be resorted to. Where there is little disturbance with gastric function the following diet list should be selected from, and the patient maintained on this diet as long as a positive aldehyde reaction is obtained, or as long as there is an intestinal toxemia.

DIET LIST FOR PATIENTS WITH DEFECTIVE LIVER FUNCTION.

May Take.

Soups: All clear soups, vegetable broths, puree of corn, beans, peas, asparagus, spinach, celery, onions, potatoes and tomatoes.

Eggs: None.

Fish: None.

Meat, Game or Poultry: None.

Farinaceous: Oatmeal, rice, sago, hominy, grits, cracked wheat, whole wheat bread or biscuits, corn, rye and Graham bread, rolls, dry and buttered toast, crackers, muffins, waffles, batter cakes, wafers, grape nuts, macaroni, noodles and spaghetti.

Vegetables: Potatoes (sweet and Irish), green peas, string beans, beets, carrots, celery, spinach, artichokes, alligator pears, eggplants, lettuce and onions. All vegetables **except cabbage, cauliflower** and turnips.

Desserts: Rice and sago with a little cream and sugar, figs, raisins, nuts and syrup, stewed fruit, preserves, jellies, jams, marmalades and gelatin; prunes, apples and pears, either raw or cooked.

Drinks: Tea and coffee (with cream, but **not milk**), grape juice, orangeade, lemonade, limeade and Vichy, cocoa. An abundance of pure water, cold or hot.

Must Not Take.

Veal, pork, goose, duck; salted, dry, potted or preserved fish or meat (except crisp bacon); oysters, crabs, salmon, lobster, shrimp, mackerel, eggs, turtle and ox-tail soup, gumbo, patties, mushrooms, mince pie, cabbage, cauliflower, turnips and cheese; alcohol.

Negative tests for urobilinogen and indican extending over a week, indicate that either eggs, fish or easily digestible meats may be taken in moderation, in my practice this being limited to not oftener than once a day. It will be found that buttermilk to which lactose has been added is the best animal protein on which to start, but I cannot too strongly urge a constant control of the diet by frequent examinations of the urine.

A detailed record of cases in which the diet was observed to influence the liver function will simply prolong this paper unnecessarily and will be dispensed with. I will state again, in closing, however,

that careful observation of patients with defective liver function, in whom liver function has apparently regained its normal capacity, have invariably shown evidences of decreased hepatic function when allowed much animal protein, with resulting intestinal putrefaction of same, as evidenced not only by a return of a positive aldehyde test, but in a return of headaches, vertigo, nausea and occasional vomiting.

Summary.

Experimental and clinical data indicate that in all conditions in which the liver is diseased a high carbohydrate diet is indicated.

In conjunction with the dietetic regime, efforts should be directed towards overcoming any tendency to the production of intestinal toxemia.

BIBLIOGRAPHY.

1. Fischler. *Deutsch. Arch. Klin. Med.*, 1911, CIV, p. 300.
2. Wells, H. G. Chemical Pathology, 1918, 3rd Ed., p. 123.
3. Herter, C. *N. Y. Med. Jl.*, 1898, LXVIII, p. 89.
4. Richards and Howland. *Jl. Exp. Med.*, 1909, II, p. 344.
5. Ewins and Laidlaw. *Jl. of Physiol.*, XLI, p. 78.
6. Eustis. Biochem. Bull., March, 1915, Vol. IV, pp. 97-99.
7. Whipple and Sperry. Johns Hopkins Hospital Bull., 1909, XX, p. 278.
8. Opie and Alford. *Jl. A. M. A.*, 1914, LXII, p. 895.
9. Lavake. *Am. Jl. Obst.*, 1916, LXXIV, p. 401.
10. Editorial, *Jl. A. M. A.*, 1917, LXVIII, p. 732.

Discussion on the Paper of Dr. Eustis.

Dr. J. E. Knighton, Shreveport: I think Dr. Eustis' paper serves to emphasize what our chairman said at the opening of this section this morning, namely: the importance of paying more attention to and having a better knowledge of internal medicine. As a matter of fact, I think we all recognize the situation that the majority of the profession do not give that attention to internal medicine that they should. A young man comes out of school with a diploma and looks forward to the time when he can do major surgical operation. The spectacular side of medicine appeals to him more than tedious, painstaking scientific work that is brought out and developed by internal medicine.

I think the Society is indebted to Dr. Eustis for bringing this phase of internal medicine to our attention this morning. We do not give the attention to internal medicine that we should, and especially we do not give attention to dietetics as we should. We should recognize the fact that dietetics is one of the most important parts of therapeutics with reference to any of the diseases. We should ever keep this in mind.

I can add nothing of value to what the doctor has said in his paper. I simply want to emphasize the importance of the medical profession paying more attention to internal medicine, and especially to dietetics.

There is one point he brought out that I want to emphasize, and it is a point that has been pointed out for some years past—that in gall-bladder diseases we have an associated cholangitis, and especially after operation, and in these cases, surgical as they are, very little attention is paid to the dietetic management of them afterwards. Dr. Eustis him-

self, as I remember, called attention to this point before the Surgical Section of the Southern Medical Association at Memphis last fall. He did not mention it in his paper, but I would emphasize it, and I hope he will mention it in closing the discussion. Every case of gall-bladder operation should have special attention with reference to dietetic management after operation. If these cases do not receive such attention after operation, your results will not be what you think they should be.

Again, I wish to thank Dr. Eustis for bringing this subject so forcibly to our attention this morning.

Dr. R. B. Wallace, Alexandria: Dr. Eustis has brought a very important subject before us, and it should be of interest to all of us who are engaged in medical and surgical work. He goes into the subject much more broadly and minutely than we can appreciate, but what he has said sets us thinking. That is one of the great advantages of coming to these meetings. It gives us the opportunity to be free in the expression of our opinions and to derive knowledge from others.

I would like to ask Dr. Eustis how he makes that particular test and whether it is to be brought out in connection with the publication of his paper?

Dr. F. W. Parham, New Orleans: I did not expect to be called upon to participate in this discussion. I devote myself almost entirely to surgical work, and have been frequently associated with Dr. Eustis and have derived helpful assistance from his suggestions along the line he has brought out to-day. I believe that we, as surgeons, neglect too much the assistance of the internist. I often feel like saying this—that the surgeon works with his hands, while the internist works with his head, although the surgeon shows the internist something by making a hole, and sometimes correcting his diagnosis. That leads me to say that we ought to have coöperation between the surgeon and internist in our most important surgical work. Frequently the surgeon is misled by the failure to consider the medical treatment of his cases particularly, and there is where the sensible, common-sense internist, one who is scientific in his attainments, will give greater assistance to the surgeon.

In connection with gall-bladder trouble, our cases do not always improve as we think they should. We have done a satisfactory operation, according to the rules of our art, and yet the patient does not continue to improve as we think, following our general experience, such a patient should improve. There is an instance where the internist frequently will help to turn the scales in the right direction.

I believe Dr. Eustis has worked out a very important line of suggestions by these methods of examination to which he subjects such patients. After a gall-bladder operation it is important to follow some sort of dietary. Not all people are able to take eggs as soon as the stomach is ready for them. I have seen people poisoned by eggs after operation. I have seen considerable trouble caused by the use of eggs frequently. I remember one patient who had a most intense intractable nausea, and I was unable to do anything for that case until I stopped eggs. They were hunting the country for fresh eggs to give to this patient. As soon as we stopped the eggs the patient did better, and finally got well. I have made it a rule, after all operative procedures, not to give proteins or fatty foods, but to rely chiefly upon starches, and I have been influenced by Dr. Eustis in following this plan, after a serious operation, until all nausea has completely disappeared and the patient seems to be incapable of retaining anything. I never depart from the rule of being careful about the condition of such articles of diet as Dr. Eustis has

pointed out that may give rise to undesirable changes and turn the scales in the wrong way.

Dr. Joseph J. Frater, Shreveport: It seems to me some of the things brought out in this paper we have all more or less realized. Medicine, with some of us who are here, is divided into surgeons and general practitioners, and a whole lot of us are simple general practitioners. Some of the surgeons who operate frequently and are so well versed in internal medicine are just general practitioners. I would like to ask Dr. Eustis if he can suggest some good work on dietetics that will help us surgeons and general practitioners? We need to study more thoroughly some of these problems. Some of us have good men to refer to, like Dr. Eustis and Dr. Knighton, who are ever ready and willing to help us out of any trouble. If we had more knowledge of these cases and of this subject we might save our patients and ourselves some anxious rest. When we try to put our patients on a restricted diet—that is, leaving off meats—they complain. They do not like it, and yet we know, from many tests that have been made, that some men have been rendered physically very capable by following a strictly vegetable diet. Many of you doubtless recall the tests that were made at Battle Creek, Mich. As you recall, they took a number of college boys and fed them on strong meats where they were engaged in athletics. They also took another bunch from Battle Creek and fed them on a strictly vegetable diet; and you remember that the men who won out in these tests were those who were put on a strictly vegetable diet and not the strong-meat men.

Dr. John M. Barrier, Delhi: I cannot add to this discussion from a scientific standpoint, but I was reminded of what the last gentleman said in reference to the general practitioner. I find that the question of dietetics has been very helpful to me in my practice. When I have been unable to make a diagnosis of any particular trouble with the stomach, liver or what not, I have usually prescribed a mild placebo and put the patient on a restricted diet, lessening the amount and cutting out the strong meats, and so on.

Dr. J. L. Adams, Monroe: I am sure that we are all of one accord in appreciating the value of Dr. Eustis' paper, and I can assure him that he has our support from beginning to end. It is a very important subject, that is passed up usually by physicians and largely passed up by the text-books.

The average physician, in prescribing a diet, tells the mother to keep the patient on a soft diet, and the mother or the attendant is made responsible for what constitutes a soft diet. It is like our judgment—it depends where we are as to what a soft diet is.

I would like to emphasize the point brought out relative to having coöperation of the internist in surgical work. I do a little surgery myself, and I see a little surgery done by others in New Orleans and elsewhere, and I never attempt to do an operation without feeling that I need the hearty coöperation of an experienced internist. It does not make much difference about the magnitude of the operation, you need some man to steer you safely on the internal side of the proposition. You can get into serious trouble unless the internal side of the case is well cared for. That brings out, as Dr. Knighton said a while ago, renewed insistence on the fact that we should encourage internal medicine more. Usually those fellows in the medical centers do the operative work and we general practitioners are simply shipping clerks. We send the cases to the medical centers to be operated on, and the surgeons fail to give us value received for our shipments. We send them our cases and they

should help us in part by encouraging and assisting us to study our cases more carefully and closely and help them make a diagnosis. The surgeon is put to his wit's end, for the reason that he has not the time or opportunity to study the case as carefully as he should do, and the practitioner who has brought the case to him for some reason or other has not given the patient the proper amount of attention and study, so that both the surgeon and practitioner are in the dark.

Dr. Allan A. Eustis, New Orleans (closing): I wish to thank the several speakers for the very kind reception of my paper. It is a subject I have been much interested in for a good many years, and it is a great relief to get up before this Society now and not find a dozen or four dozen broad grins on the faces of the men. I believe that there is a lot in this, and I have attempted in some individual work that I have done on this question to set it on a sound, scientific basis.

Regarding the post-operative treatment of gall-bladder disease, I would like to mention, in passing, that phase of the subject, because I called attention to the relationship that is always associated. I say that because I have followed numerous cases in which you will find positive aldehyde appearing after operation on the gall-bladder, which will not obtain in an operation on other parts of the body, so that it cannot be the effect of the anesthetic.

Regarding the aldehyde test which I use in this work, and which has not met with universal use in this country, I will say that an article recently appeared in the **American Journal of the Medical Sciences,** in which the author stated that the purol derivative would give a positive aldehyde test. The only purol derivative is urobilinogen, and if you do get the purol derivative it will not get in there unless the liver cells are defective. While I do not like to quote from our enemies, we have a lot to learn from Germany and Austria. I have been using this test for the past eight years. Of the last lot, I bought four ounces, realizing it is a German product which would enhance in value. I paid $9.30 an ounce for that salt, and unless I was getting results I would not be so idiotic as to pay that amount for it. This salt is selling to-day for $20 an ounce. It does not take a great deal.

The formula for Ehrlich's aldehyde reagent is:

Paradimethylamidobenz-aldehyde	2 grams
Hydrochloric acid (chemically pure)	20 c. c.
Water.	80 c. c.

Two grams of it, or one gram, is enough for three or four hundred determinations; so that it does not take a great deal. You can buy a certain amount wholesale in dram vials. You do not have to invest $20 in it. The test is made by simply adding two or three drops of this reagent to a small amount of urine in a test tube, and, in the presence of urobilinogen, a bright cherry-red color is obtained. I believe it will be generally adopted in this country now, because I noticed in a recent article in the **American Journal of the Medical Sciences** that it is being used as a uniform procedure in the Mayo Clinic, and it will be obtained in this country on a cheaper basis.

I wish to thank Dr. Parham for his kind remarks and to bring forward the importance of coöperation between the surgeon and internist, not that I am trying to increase my practice, but from the patient's standpoint, because I have had more than one disagreeable experience with surgeons who have operated on cases that I have referred to them. They are not all so broad-minded as Dr. Parham. I recall one patient in whom

I was very much interested, a relative of mine, who had a laparotomy performed for an extensive pelvic condition, with appendectomy. She was vomiting for three or four days. I found that the nurse was giving soft-boiled eggs. I told her to stop it. The surgeon came along and disagreed with me. I went back the next day and found that the patient was still gettings eggs. I told the surgeon that I would not give the patient eggs, as her urine was loaded with indican, and the surgeon said to me, "You are a damn crank on indican." Here was an instance where the surgeon overstepped the bounds. Some surgeons do not hesitate to coöperate with the internist in these cases, while others do not.

I cannot stress too much the importance of the surgeon coöperating with the internist as regards post-operative treatment. I have seen patients poisoned by improper dietetic measures, and I cannot urge too strongly the importance of dieting after post-operative procedures and more especially after gall-bladder cases.

In reply to Dr. Frater, I dislike to say it, but there is not any good book on dietetics, for the simple reason that every book on the market has been written by a physiological chemist, or a laboratory man without clinical experience, or these books have been written by a clinician, a gastroenterologist, with a limited knowledge of physiological chemistry. In most of the books on the market, if you read the chapters on the dietetics of liver diseases you will find that they say that the liver should be conserved and carbohydrates should be restricted as much as possible and an abundance of fats given, absolutely contraindicated. The best book I have seen is one by Tibbles on "Diet in Health and Disease."

There is another good book, written by Smith, of Boston. It is readable, but I do not coincide with all that he says. However, he gives some good points, and the title of this book is "What to Eat, and Why."

I believe and feel that we will get better results if there is greater coöperation between the surgeon and internist, because there is no doubt, in my experience, that 90 per cent of the cases that we see are suffering from overindulgence in proteins and from subsequent protein poisoning.

Dr. Leckert: I would like to say that Dr. Eustis is altogether too modest to say that he has written a book himself on dietetics, but he has done so, and I would like to ask him when that book is going to be published?

Dr. Eustis: If any of you have attempted to write a book in the midst of an actual busy practice you realize how difficult it is. The manuscript is ready for publication, but every time I thought of sending it to the publisher something new came out and I delayed it. The principal reason for the delay of two years is on account of the recent work of Allen on the treatment of diabetes, to which I do not wholly subscribe, and I have been waiting for a sufficient number of cases to bolster up my side and to give some reasons for advocating that generally accepted method.

RADIUM TREATMENT OF FIBROID OF THE UTERUS.*

By ERNEST CHARLES SAMUEL, M. D.,
Radium Institute, Touro Infirmary, New Orleans, La.

Dr. Robert Abbe made the statement some few years ago that he had successfully treated with radium a large fibroid of the uterus. His statement was received with a great deal of skepticism by a large majority of the medical profession, but as time has gone on and radium therapy has been placed on a more rational basis we must realize that we have a very potent instrument in the possession of the radium salts.

When Dr. Abbe started his work the only place where radium was obtainable was from the Curie Laboratory, of Paris. There was no standard of measurement, such as the Curie unit, which we accept to-day; no definite screening measures provided. The physics of radium at that time were very well understood, but the physiology was an unknown quantity, and it is such men as Becquerell we must thank for blazing the way to a more rational therapy than was first instituted. Radium, like the X-ray, before it was well understood, produced some very mean burns, and, of course, was condemned, only because there was insufficient evidence as to what we were able to accomplish with the radio salts.

A great deal of discussion has been raised in this country and abroad as to how much radium (or what is the smallest amount of radium) we should use in these conditions. The concensus of opinion among the radium workers at the present is that fifty milligrams of the element should be the minimum amount of salts that should be used. The average fibroid generally requires at least fifty milligrams inserted in the uterus to have the desired effect, and repeated by the method that will be described later.

I would first take up the indications for radiation of the non-malignant tumors of the uterus. These are found in cases where the hemoglobin is under 50 per cent on the Talquest scale, due, as you know, to the terrible bleeding that usually accompanies these cases, and where operative interference cannot even be considered. For patients with cardiac or renal complications, or where the blood pressure of patients is over 200 millimeters of mercury, or for patients not willing to submit to any operative interference whatsoever, or in cases where you wish to preserve the pelvic organs, and

* Read at the 39th Annual Meeting, Louisiana State Medical Society, New Orleans, April 16, 17, 18, 1918.

where a myomectomy is not indicated, treatment with radium is the best possible method.

I am still of the opinion that purely uncomplicated cases of fibroid, where a woman has passed the child-bearing period, surgery is still the best procedure, but in my last statement I wish more than ever to emphasize the fact that the treatment can be carried just so far, and not produce a menopause, and the woman still retains her function that she was intended for—that is, to produce children, which we all know is the desire of most of these patients suffering from this pathological condition.

Patients showing the counter-indications for radiation, as I have said before, the uncomplicated cases after having passed beyond thirty-five or forty years of age, should be operated upon. All sloughing fibroids, pedunculated tumors, cases where there is suspicion of malignancy, are in this class. I wish to emphasize my last statement, as I believe that the tumor that is left alone, such as the usual fibroid, does not undergo malignant changes. It is either malignant from the beginning or is benign. In cases with serious pelvic complications, such as a great amount of adhesions or with large pus tubes, a preliminary curetment for diagnosis is always advisable.

I would like to say a few words about technic. In the intrauterine applications of radium we have to observe the same strict rules of asepsis that we do in any vaginal operative interference, as the tubes that contain the radium come in contact with the endometrium, and, as we know, no infectious material should be carried in. Patients should be given a light cathartic the night before, and report for treatment early in the morning. An enema, followed by a lysol douche, is given. If the patient is nervous, a hypodermic of one-quarter grain of morphia is given; this usually controls pain and nervousness after the tube has been inserted. The celluloid tube which contains your radium dosages is sealed with paraffin and put in 40 per cent formalin for at least twenty minutes before it is used. A string attached to the tube by an eye, after the tube is inserted into the uterus, acts as an anchor, which is attached to the skin by a small strip of adhesive, also facilitating the withdrawal when the treatment is finished. It generally requires some little dilatation, which is easily accomplished with the Hagar graduated dilator, producing very little discomfort to the patient. Some patients complain most pitifully, and others do not, and in over one thousand applications given we have only required an anesthetic

twice. The vagina is next packed with sterile gauze, to prevent the expelling of the tube if the patient is put to bed and not allowed to get up, and must use the bed-pan. Some patients complain a great deal of nausea, and others do not, so that you can never say exactly what is going to take place.

The usual exposure should last for twelve hours, using 50 milligrams of the element, which gives 600 milligram hours as a dose. The patient is requested to return in seven days for another exposure. This is repeated for three successive weeks, when a menstrual period is allowed to come in before resuming the treatment, and if the first treatment is given early after the last menstrual period, and the patient is over thirty-five years of age, we sometimes do not find a recurrence of the flow, and, if it does appear, it is usually diminished in amount.

After thorough examination by the referring physician the patient is allowed to rest for three or four weeks, and at the end of this time is examined again, when considerable reduction in the size of the tumor is generally noticed. Another series of treatments is given, of shorter duration—from six to eight hours—and at the end of this time usually suffices. It takes from six to seven months for the tumor to entirely disappear, in some cases even longer, and in some instances menstruation has been stopped, with no appreciable effect on the tumor, but it does not seem to worry the patient very much.

Some patients complain, after radiation, of a thin, watery discharge. This is due to the action of the radium on the glands of the cervix and endometrium. This disagreeable symptom rapidly passes off, especially if the patient takes the saline douches that are prescribed twice daily, as warm as she can stand it. We have not observed any other unpleasant symptoms in the large number of cases that have been treated up to the present time.

Radium is preferable to the X-ray, for the reason that radium destroys the endometrium, and the Rœntgen ray causes cessation of the ovarian activity, and the symptoms of the change of life are, therefore, very mild after radium treatment, whereas they are very much more pronounced after the Rœntgen treatment, due, as you know, to its action on the ovary. Another reason: the Rœntgen ray requires more of the patients' time, for the reason that they have to come to the radiologist for repeated radiation, this not being the case with radium; it only requires the desired number of hours, as mentioned previously.

The time has been too short since radium has been more generally used for these conditions to draw any absolute conclusions. If we can observe these patients at the end of from seven to ten years and still find them free of a tumor and no return of the hemorrhage we could say that we have accomplished a great deal and have not subjected the patient to the dangers of operative interference.

The tables of a summary of our work up to the present time will be attached to this paper and will be for your consideration.

Discussion on the Paper of Dr. Samuel.

Dr. W. D. Phillips, New Orleans: I came in a little late and did not hear all of Dr. Samuel's paper, but I agree with him in reference to the use of radium in gynecological cases. In one type of case particularly—that is, the hyperplastic endometritis cases—radium works wonderfully in some of them. I am sure we have all had an opportunity of curetting such cases two or three times without any results. The bleeding would let up for a while, and then recur. I have used radium in such cases and have obtained excellent results with one dose, but in a few cases I have had we used one dose, extending over twenty-four hours, and it stopped bleeding entirely. I had a case recently in which I used it in a recurrent malignancy in the vault of the vagina. The woman had been operated on some time before, and the condition recurred. This patient came in because of foul-smelling discharge and also bleeding. For a little while we could control the hemorrhage, but there was practically nothing to do for her except to give two doses, twelve hours apart, of radium and have her come to the office every day. It is given at intervals of three or four days, and the foul-smelling discharge has stopped, and the bleeding surface has practically disappeared. Of course, I do not think we can say that case is absolutely cured, but by repeating the doses of radium we may be able to tide the woman over for several months with a comfortable existence.

As to the treatment of cases of large fibroid, I had a case recently that I was ready to operate on, but some one suggested the use of radium. The patient consulted another physician. He agreed to the use of radium if I would permit it. In large fibroid tumor cases I have been afraid of radium, particularly large fibroids of long standing, because of the danger of changes taking place. We have seen fibroids that have existed for a long time and then have operated on them. In some cases we have done supravaginal amputation, and there has been a recurrence of the disease in the stump. We know that in large fibroid cases these changes take place, and I hesitated in this particular case because the fibroid had existed for quite a while. I gave in, and was surprised, after one dose of radium, to see the change that had taken place in the tumor of the subserous type pressing on the anterior wall of the vagina and bladder. After one dose of radium, extending over twenty-four hours, that tumor had practically disappeared. The patient has had a second dose, and I have not seen, thus far, the effects of the second dose.

Dr. Samuel mentioned leucorrheal discharge. I have observed that in the few cases I have had, and as my experience has been limited in radium I do not want to be too optimistic; nevertheless I have been very

well pleased in the hyperplastic form of endometritis with its use. We have all curetted such cases, and, as I have previously remarked, they have done well for a while, and then the bleeding would recur. The use of radium is particularly indicated in this class of cases. Without it there is nothing else but to sacrifice the uterus, and in a young woman we hesitate to do that. I do believe that we have a golden era ahead of us in the use of radium.

Dr. E. Denegre Martin, New Orleans: I would like to ask Dr. Samuel as to the indications for radium in carcinoma of the cervix. I think we have a most valuable aid in the use of radium in these inoperable cases. I recall the case of a woman who had a cauliflower growth appearing at the vagina. When she was discharged I had no idea there was anything that would benefit her. This was about eighteen months ago. Radium was used in her case, and since then there has been absolutely no sign of trouble. The growth has disappeared. She has no pain and is able to perform the duties of a housekeeper. She may have a recurrence.

Dr. E. C. Samuel, New Orleans (closing): I purposely did not touch on the subject of malignancy, but I must agree with Dr. Phillips in everything he has said in so far as the radium treatment of malignancy is concerned. In one statement, where he brings up the question of the tumor undergoing carcinomatous degeneration, it was one of the things I called especial attention to. There is no absolute evidence that we have at hand to-day wherein a tumor that is not malignant at the start becomes malignant later on. When it does become malignant later you can say that there have been cells that have been existing from the time the tumor just started. That is the opinion of some pathologists, and it is still a debatable question.

If the president will permit, I will try to answer Dr. Martin with reference to the question of malignancy and radium. We have, up to date, over 700 exposures that we have given for malignant disease of the cervix, the vaginal vault and the pelvic organs. There is no question in the world but that radium offers the greatest possible advantage in malignancy of the female genital organs, especially the uterus, that we have at our command to-day. Of course, as radiologists and radium therapeutists we do not say that radium or anything else is to supersede surgery. Surgery comes first. In early cases of malignancy of the uterus within the operable stage they should be treated with radium. It is a surgical condition from the time it is first found, if it has not passed beyond the stage of operative intervention. In cases that come to you far advanced, with a large crater, with a foul discharge, anemic, and practically ready for your signature on the death certificate, radium offers the most wonderful hope that you have to give these patients to-day. We have some cases that have gone on for nearly three years that are remarkably well, but how long they will continue I do not know. In the majority of cases, we have seen them go along for fifteen to eighteen months or two years without evidences of recurrence, but the majority of them show some evidence later on, say at the end of two years or at the end of two and a half years. If you have recurrence after radium therapy, there is nothing in the world that will stop it. Radium is of no value in such cases. It is like putting a match to gasoline—these patients go right straight on and go down. What the explanation of this is nobody knows. These patients come to you, and when you place 75 to 100 milligrams of radium, with proper screening to prevent any effect on the neighboring organ, the patient will tell you that the discharge has

stopped, there is no more odor and she feels that she is well. When you examine her you see the typical appearance on the cervix of the radium application, namely: a thin, whitish film, which you find in these cases, and oftentimes physicians think they are sloughs. They are not sloughs; it is the effect of the radium on the crater-like substance, and they go on, and after you have finished your series of treatments, which last generally from two to three months, they are allowed to rest for six months, when they return for re-examination. The effect is almost phenomenal from radium in the majority of cases. There may be no evidence of the disease left, but they go like that for eighteen months or two years, and in the majority of cases there is recurrence taking place in the vaginal vault or deep in the pelvic structures. If there has been a pan-hysterectomy done it is practically useless to treat them with radium, because it does not do them any good. The majority of them die from urinary complications due to the growth encroaching on the ureters and gradually occluding them, and urinary sepsis is generally the cause of death.

A SIMPLE SURGICAL AFTER-TREATMENT.*

By E. L. SANDERSON, M. D., Shreveport, La.

A large part of the literature on surgical after-treatment deals with details suited to special cases. I wish to draw some general conclusions applicable to all cases, and suggest a few simple procedures which, theoretically, meet these requirements, and which, in pracetice, have given very satisfactory results.

To discuss any phase of operative surgery, and especially that pertaining to the time of operation and the days immediately following, one must keep before him, as a background, man's biology.

The patient you are about to operate upon is a wonderful machine, every part of which is automatic and interdependent to such a degree that its achievements are almost Godlike.

To contemplate the vast complexity of actions and the perfect coördination necessary even in the simpler acts of life, you would suppose that many forces were employed.

The wonder of it all is its simplicity. Every act, whether it be the drawing of a breath or the taking of a city, requires only the simple processes of osmosis and chemical reaction.

Environment, which we now recognize as the prime factor in our development, accomplishes her work by interfering with or influencing osmosis and chemical reaction. Continued, like interference or influence produces a change of function and leaves its imprint on the race. But, after all, the one-celled protozoon who takes

* Read at the 39th Annual Meeting, Louisiana State Medical Society, New Orleans, April 16, 17, 18, 1918.

his food by endosmosis from fluid surroundings and excretes by exosmosis through the same membrane, is exactly like ourselves, except that we represent a large collection of such protozoa, become interdependent by long association, and finally, very sensitive to influences suggesting past experiences to themselves or to their progenitors in ages past.

It is this last element that besets the surgeon on every hand; for, be as kind and gentle as you may, your operative procedure still remains very like the onslaught with tooth and claw upon our ancestors in the forests of antiquity.

Here lies the secret of shock: Abdominal distention and its attendant nausea, and of that long train of nervous phenomena so often lasting for months after operative procedures.

The many chapters written about the vasodilators and constrictors, the excitors and inhibitors, and the intricate maze of actions and reactions involved in shock and post-operative neurasthenia, which might well be called chronic shock, may be summed up in the word "fright," or the phrase "recollections of injured posterity."

Throughout our development as a species we have been attacked by our fellows and other species. The attack, especially when unable to defend ourselves, has always meant loss of blood, prostration, great pain and infection. If the abdomen was opened it meant torn viscera; the stomach was emptied to minimize escape of contents. Distention and cessation of peristalsis followed to facilitate adhesions and limit peritonitis.

An aseptic surgical attack arouses these recollections, and the same phenomena are prone to follow. Therefore, we feel justified in stating that one-half of surgical after-treatment should consist in combating the evil effects of man's wonderful power of association of present experiences with the perils that beset his ancestors since the beginning of time.

The remedy is simple and efficient: Protect your patient before and after operation from all influences suggesting danger or pain, as far as possible. Give morphin before operation and continue afterward until the period of severe pain is past—not just enough to cause nausea and wakefulness, but to relieve almost, if not completely. Don't instruct the nurse to give as little as possible, but instead all that is necessary. After forty-eight hours, in ordinary

cases, it may be decreased rapidly and discontinued in a few more hours.

However, if for any reason its effects are allowed to wear off and the patient begins to suffer greatly, don't return to it, or a condition resembling acidosis will develop, which I cannot explain. This very action is the underlying factor that carries near to death's door so many patients who are really in the hands of skillful operators. Morphin is given before operation because the patient takes the anesthetic easier; after operation the nurse is instructed to give a hypo if very necessary. The previous morphin dies out completely, the patient becomes wild with pain; at last morphin is given and all the symptoms of acidosis appear. This one point is of extreme importance.

Yet the rule to fight the use of morphin is so universal that many of us forget that fire has any other purpose than to burn houses. The nurses have to be constantly reminded to not let the patient suffer, else you will come back in the afternoon following the operation and find the nurse doing her best to ease and quiet your patient—holding the morphin back as a last resort.

Of course, it should not be continued longer than necessary; common sense suggests this. I have written less than a dozen prescriptions for morphin to be used by the patient himself since the Harrison law was enacted. I have not had a single operative patient to show the slightest sign that the two or three days' relief from pain had given them any desire whatever to continue to take morphin. And when I say relief I mean complete relief. A sixth or eighth of morphin given following an abdominal section should not thus be wasted on an adult.

Now, there is only one other factor of note in surgical after-treatment; that is osmosis.

The vomiting is due to deranged osmosis either in the stomach, where irritating substances are being secreted or excreted, or in the brain cells, where membranous coverings are not functioning properly, thereby admitting irritating elements to the cells or retaining combustion products that should be expelled by exosmosis. The surgical fever is a disturbance of the osmotic power of the skin or tissue cell coverings which are admitting toxic substances or retaining the products of tissue change. Stoppage of excretion and secretion are simple matters of osmotic disturbance. The absorption from infectious surfaces depends solely on the osmotic action of the cell coverings.

Water is the osmotic fluid of our bodies. Without it life cannot exist. A lack of it makes of our organism a hungry sponge, ready to take into itself any fluid which may be in contact with it, whether it be water or the vilest pus.

The law of osmosis is simple—two liquids, separated by an organic membrane, tend to pass through and mingle. The tendency to flow is from the rare to dense and in the direction of greatest pressure. In health, our osmotic functions are perfectly balanced. A certain dilution of body fluids must be maintained for this balance. of function. When this dilution varies from lack of water there is retained in the cells certain substances which act upon the nerve centers and is manifested by thirst. This unquenchable thirst following operation is not a morbid desire, but an eloquent appeal that you reëstablish the osmotic equilibrium. The restlessness and sleeplessness are due to the retention in the nerve cells by defective exosmosis of substances which should be excreted.

Absorption of toxins from the bowel or wound surfaces is encouraged by lowered tension in the tissues and increased density of tissue fluids. Secretion and excretion are disturbed, because they are purely osmotic processes.

But the stomach will not retain water, you say, and that is evidence that the thirst is morbid. The stomach rejects it because it has learned in ages past that opening the abdomen meant opened viscera, and that anything taken into the stomach increased the escape of contents. The stomach does not discriminate between your laparotomy and the attack of the wild boar. But they did not drink water per rectum in ancient times, fortunately; therefore you have this unguarded portal through which you may transport the life-saving water to the starving tissues.

Of course, you may think I have not covered the subject because I have not referred to position, drainage, heart stimulants, etc. Drainage and position of patients is a matter of favoring osmosis. And as to strychnin, camphorated oil and digitalis, I have not given either of them in a single case for five years, and, of course, have about forgotten the little I knew of their action.

I have used the term water instead of saline purposely. There is no more reason for drinking saline by rectum than by mouth.

In short, a simple and efficient surgical after-treatment will be found in morphin to control man's inborn tendency to violent reaction to injury, and water to maintain or restore osmotic equilibrium.

Discussion on the Paper of Dr. Sanderson.

Dr. O. W. Cosby, Monroe: If I am permitted to discuss a paper that I have not heard in its entirety, I will apologize by saying that I knew something of it beforehand. I cannot discuss it in its entirety because it is a new idea. So far as my judgment goes, it is a splendid idea. I want to say that, entirely apart from any infectious trouble, one of the greatest factors in these cases is metabolic derangement; that primarily our first fault is a metabolic derangement. Incidentally infection creeps in, and whereas a few years ago focal infection was the most important thing for consideration, so far as we could see, I believe now that the most important thing in medicine is metabolism. The reason that this man is infected, and that man is not infected, is by reason of his natural resistance, and if we could understand the enigma of metabolism and the surchargization of the system, if I may use that term, with waste products, we will solve the problem of infections and other diseases. We have been taught by a number of men that the body chemistry is the most important thing of all, and that infections are a secondary matter. A patient may die from invasion of the pneumococcus or streptococcus or other kind of coccus. The individual who is infected has previously laid the ground or foundation for it. I believe what Dr. Sanderson has said in regard to water and dilution is the most important factor that there is in connection with metabolism.

Dr. E. M. Ellis, Crowley: I think the essayist has laid the ground for considerable thought in the matter of after-treatment in certain cases. I believe, however, from a surgical standpoint, that if a patient is primarily prepared for an operation, the after-treatment does not amount to much. I am a strong believer in having a man's bowel chemistry in the proper state before subjecting him to the terrorizing elements of an operation. I believe that when you have a surgical case that that case should be taken a few days before the time of operation is contemplated and subjected to a thorough preliminary course of treatment; that his alimentary tract should be thoroughly cleansed; that you want to be sure you have no acidosis in that patient before beginning the operation, and that his bowel chemistry is absolutely normal. You want to see that there is no abnormality in the urine, if possible. If the urine is loaded with indican, you want to eliminate that, if possible, before subjecting the patient to a severe operation. After this is done, in the meantime, you will have obtained the thorough confidence of the patient, which, of course, is a very prime factor in surgery, and lead him up to the idea that the operation does not amount to much, and after operation there will be very little suffering. Get rid of the idea of fright and fear of the operation, and you will have accomplished a great deal with your patient.

Then comes the day of the operation. I believe, as the doctor has said in his paper, that a preliminary hypodermic of morphin is very essential. I am in the habit of following Crile's method of giving scopolamin with it unless contraindicated. I know it has been abandoned by most surgeons, but I believe by doing it the patient has no fear whatever of the anesthetic and will take the anesthetic absolutely unconsciously. After the anesthetic is administered—and I believe a combination of gas and ether is the best of all—your patient will come out of the operation with absolutely no shock, especially if you combine a local anesthetic with your general anesthetic after the method of Crile. I believe if you

will adopt that method you can operate on a patient for two hours and he will have very little shock after the operation. It has been my plan, if the operation is at all severe, to subject the patient during the hour of operation to what is known as the axillary stab—that is, I introduce a pint of normal salt solution during the hour of operation, which will take care of the thirst following the operation for twenty-four hours. If the operation is at all severe, in order to combat any acidosis that may appear or lack of fluid in the body, I usually subject the patient to the Murphy drip, with 2 per cent bicarbonate of soda. It takes very little morphin to control the patient after that, and you do not find that the pulse goes up much. There is very little reaction from the operation, and I have had no occasion to give a heart stimulant for two years in surgical shock.

Dr. E. Denegre Martin, New Orleans: So far as the after-treatment is concerned, Dr. Sanderson gave the gist of it in the last two lines of his paper, only it took him a long time to come to that conclusion.

In the past there has been a great lack of preliminary preparation of these cases for operation. They are taken right off the street in some instances and operated the same day, and I believe many of the unfavorable results are due to the fact that the surgeons did not have an opportunity in preparing them for operation. Again, I am convinced that we have been over-preparing our patients, and for years we have been over-treating them after operation. The old method of purging patients the third day after operation is the most damnable practice ever instituted, and some surgeons are still doing it. My personal experience is this: to give a patient a purgative a night or two before operation. I operated on a patient a few days ago; that patient had no purgative, and did not have a particle of trouble. A purgative given the night before operation upsets the patient, and I believe the nausea and after-trouble are due to that fact. I am convinced that it is the heart stimulant and treatment, and especially the liquids we give by stomach, such as orangeade and lemonade, that upset these patients. If you operate on them with instruments and not with fingers, and not get them upset before you start, and give morphin to control pain after the Murphy drip, and let them alone, the bowels will act normaly and you will have no complications.

Dr. E. L. Sanderson, Shreveport (closing): I wish to thank the gentlemen for their very kind remarks in discussing my paper. While my paper did not cover many points, in giving it the name, "A Simple Surgical After-Treatment," I meant to present that one thought—to control the associated ideas, associating with present injury something that happened to the ancestors. That is half of it, and the other half is to keep the fluids so diluted that the equilibrium will remain as it was before and the osmosis not interfered with.

THE FUNCTION OF THE GALL-BLADDER. AN EXPERIMENTAL STUDY.*

By F. C. MANN, M. D., Rochester, Minn.

A few years ago, at the suggestion of Dr. E. S. Judd, and in collaboration with him, I removed the gall-bladder from various species of animals and studied the effect of such procedure on the remaining portion of the biliary tract. Certain definite facts were ascertained by this study.[8, 9] I shall now make a preliminary report of other researches on the problems suggested by the former investigation. The purpose of this work has been to obtain some facts in regard to the functional significance of the gall-bladder.

The anatomic region occupied by the biliary tract is one of the most important in the body, from the physiologic, and especially from the pathologic point of view. A large percentage of operations on man have for their purpose a correction of pathologic conditions found in this area, and for this reason any increase in our knowledge of the function of the gall-bladder is of value.

There are very few structures in comparative anatomy which show a wider range of variation than are shown by the different component parts of the biliary tract from each other. The exact anatomic arrangement in one species is rarely duplicated in another species. The gall-bladder may or may not be present. This anatomic difference is observed even in very closely related species. In some species two ducts may be present. In one species, small hepatic ducts enter the gall-bladder directly. In at least one species the gall-bladder is present in some individual animals and absent in others. The formation of the common duct is rarely the same in different species. The cause or significance of these marked variations in the comparative anatomy of the biliary tract never has been determined.[7] The problem has not been solved by embryologic studies.[18]

Many theories concerning the function of the gall-bladder have been developed, varying in the functional importance which they attach to the gall-bladder from the one which implies that the organ is perfectly useless[17] to that which attributes to it the production of something necessary for the well-being of the organism. In general, each theory may be grouped into one of three divisions: (1) The gall-bladder may functionate as a reservoir for the storage of

* Read at the 39th Annual Meeting, Louisiana State Medical Society, New Orleans, April 16, 17, 18, 1918.

bile, (2) as a secretory organ, elaborating and adding something which is of importance either to the general body economy or to the mechanism of bile expulsion or its chemical action, and (3) as a regulator to the flow of bile.

The positive statements which may be made in regard to the function of the gall-bladder are very meager. It is known that the small amount of smooth muscle contained in its walls is under the usual double nervous control observed in the other viscera. It receives fibers from both the vagus and sympathetic nerves. The splanchnic nerve seems to be predominantly inhibitory in action, while the vagus is mainly motor.[2, 11] The gall-bladder undergoes rhythmic contractions which increase during the height of digestion.[16] These contractions usually exert but slight pressure within the viscus, although they are capable of exerting considerable pressure when the walls are thrown into a spasmodic contraction. The bile which has entered the gall-bladder differs from that which comes directly from the liver.[17] This difference, however, is mainly, and may be wholly, due to the increased mucous content which the mucosa of the gall-bladder adds to it.

The results of our own experiments and of those of other investigators prove[4] that usually all the ducts outside the liver dilate after the removal of the gall-bladder. This is the most conclusive proof obtained, showing that at least in some of certain species the gall-bladder has a definite function. These results probably give the clew to the major function of the gall-bladder, because an explanation of one will include the other.

We have attempted to determine the practical significance of the gall-bladder by a comparative study. If the gall-bladder is of any functional importance, it is reasonable to suppose that animals which do not possess the organ must have developed some means of compensation for the lack of it. This study includes the obtaining of critical data concerning the biliary tract in species of animals with, and other species without, a gall-bladder, together with an attempt to compare and correlate these data, assuming that one or more points of difference might be found between the two groups of animals which would add to our knowledge concerning the function of the gall-bladder. While some comparative work has been done on these structures, it consists, for the most part, of a study of the grosser relationships. As our study involves many different investigations, only brief, general deductions can be made at present. We have attempted to collate the data from the comparative standpoint

and in relation to the three possible functions of the gall-bladder. One of the most striking things noted in a review of our material is the marked individual variation in the anatomy of the biliary tract and, in a lesser degree, the same is true of the physiologic reactions studied. These variations make it difficult to draw conclusions.

While we are securing data in regard to the biliary tract of all the common laboratory and domestic animals, only that will be presented which concerns comparable species, some of which do not possess a gall-bladder.

Dilation of all the extra-hepatic ducts following the removal of the gall-bladder does not take place if all the muscle-fibers are dissected free from the intramural portion of the duct.[9] From these results great importance is attached to the interrelation of the action of the gall-bladder and the sphincter of Oddi. Accordingly, it was anticipated that either an anatomic or physiologic difference would be found in regard to the sphincter in animals with a gall-bladder as compared with those which do not possess one. The sphincter of Oddi has been studied anatomically and physiologically. This sphincter had been studied anatomically by Oddi[15] and by Hendrickson.[5] Archibald[1] seems to have been the only investigator of its physiologic action. Species which do not possess a gall-bladder were not included in the series studied by any of these investigators.

The material for the anatomic study of the sphincter was secured immediately after death and fixed in formalin. The specimen was trimmed to the smallest size which would give the complete course of the duct and paraffin serial sections made.

A histologic study of the sphincter was made in the following species of animals which have a gall-bladder: Guinea-pigs, rabbit, cat, dog, goat, ox and striped gopher *(C. tridecemlineatus)*. A comparative study of the sphincter in the deer, horse, pocket gopher *(G bursarius)* and rat, species which do not possess a gall-bladder, was also made.

In each species the bile-duct was found to be surrounded by definite bundles of smooth muscle, contraction of which closed the lumen of the duct. The amount of muscle tissue and the arrangement of it differed slightly in the various species, depending probably on the difference in the thickness of the wall of the duodenum and the course of the duct. However, no constant difference was observed in the histology of the sphincter in animals with a gall-bladder as compared to those not having this organ. It was not

possible to make any specific anatomic differentiation in the sphincter of Oddi in the two groups of animals.

The physiologic data consist of the estimation of the tone of the sphincter in anesthetizel animals. The animal was lightly etherized and a cannula was placed in the common bile-duct, with its point directed towards the duodenum. To this cannula was attached an upright glass tube having an internal diameter of about 2.5 m. m. and being about 30 c. m. in length. An aqueous eosin solution, having a specific gravity but slightly greater than distilled water, was allowed to run slowly into this tube until the pressure was great enough to force some of the solution into the duodenum. The length of the column of water after the fluid became stationary, expressed in milimeters, was taken as a measure of the tone of the sphincter.

It is obvious that this is not absolutely the correct measure of the tone of the sphincter, as other factors, such as friction, especially in animals possessing a very small duct, and anesthesia, etc., complicate the results. However, control experiments, in which the tone of the sphincter was decreased or abolished by deep etherization, bleeding or formalin injections, proved that this method was fairly correct.

The pressure withstood by the sphincter was measured in the following species of animals which have gall-bladders, namely: the cat, dog, goat, rabbit, guinea-pig and striped gopher.

The pressure was found to vary considerably in the different species and the different animals, making it difficult to draw conclusions. However, the data show that, under light ether anesthesia, the tone of the sphincter in each species of animal possessing a gall-bladder which was tested, except the guinea-pig, would withstand a pressure of 100 m. m. of water. Sometimes the pressure withstood was much greater, and very rarely slightly less than 100 m. m.

In the guinea-pig the pressure withstood was rarely over 75 m. m., and frequently considerably lower. This was partially due to the trauma incident to the technical difficulties encountered in inserting the cannula.

The pocket gopher and rat were the only species obtainable without a gall-bladder which were suitable for the investigation of the tone of the sphincter. The results of a large number of experiments are the same; in no instance was any pressure or, at most, only a very slight, usually not over 30 m. m., maintained by the sphincter. In most cases all the fluid would pass into the duodenum. This would seem to show that the sphincter is not physiologically active

in species of animals without a gall-bladder, or, at least, not active to the same degree as in species possessing a gall-bladder.

The anatomic variations in the dimensions of the common bile-duct has been considered as a possible means whereby an animal without a gall-bladder compensates for the lack of it. Data have been obtained in regard to both the diameter and length of the common duct in animals with and without a gall-bladder. The data secured, which is not yet completed, are quite variable, and it is obvious that it is difficult to make comparisons. However, after considering the variations both as regards the animal and the species, the results do not seem to warrant the belief that there is any relation between the dimensions of the common duct and the presence or absence of the gall-bladder.

The comparison of a few species illustrates this point. The horse, which does not possess a gall-bladder, has a relatively short duct with a large diameter, while the ox, which possesses a gall-bladder, has a duct of very nearly the same dimensions. The same is true in comparing the deer and goat. However, the rat and pocket gopher, both being species without a gall-badder, have both comparatively and usually actually longer ducts, with a narrower lumen, as compared with such species as the guinea-pig, rabbit and striped gopher, all of which possess a gall-bladder (Table 2).

A comparison of the thickness of the walls of the common bile-duct in the species of animals compared herein does, however, reveal a difference. In general, the walls of the ducts in species of animals which do not possess a gall-bladder are thicker and contain more muscle than the duct walls of those species having a gall-bladder (Figs. 7, 8 and 9).

One of the points at which the biliary tract differs greatly in various species is the distance from the pylorus at which the common bile-duct enters the duodenum. As there might be a relationship between bile escapes and acid escape into the intestine with regard to alkali control in the duodenum, some comparative data upon this point were obtained. However, no differentiation between groups of animals having a gall-bladder and those without one can be made in this regard. Examples are cited as follows: The common duct of the horse, which does not have a gall-bladder, enters the duodenum between 10 to 20 centimeters from the pylorus, while that of the ox, which has a gall-bladder, enters between 50 and 70 c. m. from the pylorus. On the other hand, the duct enters the duodenum about 0.5 to 1.5 c. m. from the pylorus in the rabbit and

0.4 to 0.8 in the guinea-pig, both of which have a gall-bladder, and 1.5 to 2.5 c. m. in the rat and 4 to 5 c. m. in the pocket gopher, both species of which do not possess a gall-bladder (Table 2).

The same is true in regard to the relationship of the pancreatic duct to the common bile-duct. This relationship varies greatly in the different species of animals, but there is no constant difference in this respect in species possessing a gall-bladder as compared with those without one.

The secretory pressure of the liver has been investigated by several observers,[6, 14] but it appears never to have been measured in species of animals without a gall-bladder. The method employed by us consisted in placing a cannula in the common duct of an etherized animal; an upright glass tube was then attached to this cannula and the lower end of the tube was placed in approximately the same plane as passed through the center of the liver. The height to which the bile rose in this tube, expressed in milimeters, was taken as the secretory pressure of the liver. Our results show that there is no difference in the secretory pressure of the liver in animals with a gall-bladder from that of those without one (Table 3). Any one who has measured the pressure in the common bile-duct appreciates the great influence of respiration on intra-duct pressure. This has formed the basis for one of the recent theories of the function of the gall-bladder.[10] A comparison of animals using the diaphragm to a great extent, however, does not reveal a difference such as to show whether or not they have a gall-bladder. It is impossible to compare the horse and deer with the rat and pocket gopher in regard to their life activities, excepting by contrast. On the other hand, several species, as the dog and rabbit, compare quite closely to the horse and deer so far as the need for a powerful diaphragm is concerned.

Many observers have stated that the gall-bladder could not functionate as a reservoir. Dr. W. J. Mayo[12] gives two reasons for this—first, that the relative capacity of the gall-bladder to the amount of bile secreted is too small, being about 1 to 40 or 50 in man; and, second, the propulsive power of the gall-bladder is not sufficient to empty it quickly. We obtained some comparative data on this point by measuring the rate of bile flow for about two hours in different species, after obtaining the capacity in relation to the rate of flow.

The method consisted in etherizing an animal, placing a cannula in the common duct and measuring the amount of bile secreted for

a definite length of time. After the collection of bile was taken the gall-bladder was removed and its capacity, when it was completely filled, not distended, was measured. Naturally, the rate of bile flow was complicated by the anesthetic, as was shown by the fact that usually the amount of bile collected during the first half-hour period was the greater, but this was the only practical method to employ in small animals like the guinea-pig, the rat, etc., and the results, while individual variations are very great, are certainly comparable. The readings, however, are probably much too low in each instance.

In general, our results show that in each species of animals tested the gall-bladder could hold less than the amount of bile secreted in one-half hour, even when the animal is etherized (Table 4).

The bile which has entered the gall-bladder normally has a much higher content of solids than the bile which comes directly from the liver. This is shown by a comparison of the specific gravity of the two fluids. In the few instances in which this has been done, the specific gravity of the bile contained in the gall-bladder was much greater than that of the bile collected directly from the liver.

Another structure in the biliary tract, the function of which is unknown, is the system of folds of mucosa called the valves of Heister.[3] Logically they would be considered as mechanically adapted to prevent the bile from entering the gall-bladder. We have measured the resistance which they offer and found that it never exceeded 30 m. m. of water in the individual animals studied.

It should be emphasized that the gall-bladder, in so far as it is possible to determine, is not essential to the maintenance of health. Human beings have lived for many years in perfect health after its removal.[10] One of our dogs lived for three and a half years after removal of the gall-bladder and was always in excellent condition. We cannot say whether or not there are changes in the gastric and pancreatic secretions, as Rost asserts, because our experiments up to the present time on this point are too few from which to draw conclusions. The results of our comparative studies which, it must be emphasized, have not yet been completed, allow the following tentative statement to be made:

Negative Findings.

1. There is no specific demonstrable difference in the anatomy of the sphincter of Oddi in species of animals with a gall-bladder as compared to those without one.

2. The adhesions of the biliary tract are no different in species of animals without a gall-bladder, when considered as a group, from those species possessing a gall-bladder.

3. No differentation between groups of animals having a gall-bladder and those without one can be made in regard to *(a)* the relationship of the pylorus to the point of entrance of the common bile-duct and *(b)* the relationship of the pancreatic duct to the common bile-duct.

4. There is no special difference in the secretory pressure of the liver in species of animals with a gall-bladder as compared to those without one.

POSITIVE FINDINGS.

While the following statements are substantiated by the data obtained, it is emphasized that the species of animals without a gall-bladder studied, so far, are few.

1. The sphincter of Oddi appears to be more or less physiologically inactive in species of animals without a gall-bladder.

2. The walls of the common bile-duct seem to be relatively thicker in species of animals without a gall-bladder as compared to those possessing this origin.

The results of these studies show that there are some facts which support two of the major theories concerning the function of the gall-bladder. A consideration of the full functional significance of the gall-bladder must include the recognition that *(a)* it does add something to the bile, and *(b)* it does influence the flow of bile.

Probably in no species of animal is the gall-bladder capable of holding more than 5 per cent of the total amount of bile secreted in twenty-four hours, and in most cases it may contain little more than 1 per cent. It is, therefore, impossible for the gall-bladder to functionate as a true reservoir in the same sense that the urinary bladder does.

There is no doubt that the mucosa of the gall-bladder adds something to the bile. The character of the secretion and its functional significance has been contradicted by other investigators, and our own data are too few at present to draw conclusions. It may be that this secretion aids the action of bile or has other functions, but the only definitely known addition the gall-bladder makes to the bile is mucus.

The functional significance of the gall-bladder seems to be intimately connected with the fact that it is mechanically adapted to change the escape of bile into the intestine from a more or less continuous flow into an intermittent one. Studies on animals, practically always dogs, with biliary fistula, show that the liver secretes bile continuously, although the rate varies considerably. In most instances, however, in which duodenal fistulas have been formed, the escape of bile into the intestine has been intermittent. No studies seem to have been made on animals without a gall-bladder in regard to the flow of bile into the intestine, but it seems that, in all probability, it would be continuous with liver secretion. We have observed this in the rat and pocket gopher, but the experiments were complicated by the necessary anesthetic. Under such experimental conditions, the entrance of bile into the intestine in these two species was continuous, except for the slight changes produced by respiration. The fact that the sphincter seems to be inactive in species without a gall-bladder would imply that this was quite the normal condition. A study of some species of animal without a gall-bladder, in which it is possible to make a permanent duodenal fistula, will be necessary to definitely prove this point.

The action of the gall-bladder seems to be as follows: The liver secretes bile more or less continuously. Under normal conditions this is secreted under very low pressure. The sphincter at the opening of the common bile-duct is normally under tone, which is great enough to increase the intra-duct pressure above the resistance offered to the entrance of bile into the gall-bladder. At intervals the sphincter relaxes, allowing bile to flow into the intestine. The mechanism controlling the action of the sphincter is not known, but is reported to be under nervous control.[13] The gall-bladder not only acts as an expansile chamber for the accommodation of the difference in rate of bile secretion and bile discharge, but it also prevents some of the fluctuations in intra-duct pressure which would occur during respiration in all instances in which the duodenal sphincter is active. It should be appreciated that in all species in which the sphincter is constantly active some mechanism like the gall-bladder is necessary.

A description of the action of the gall-bladder does not explain its function. Why it should be desirable in some species of animals to allow the bile to enter the duodenum at the same rate as the liver secretion, and in other species, closely related and having practically

the same physiologic environment, to have developed a mechanism whereby it pours intermittently into the intestine, is not clear. More investigation will be necessary to eliminate this question. These future researches should include (1) a study of the sphincter in larger series of animals without a gall-bladder and (2) a determination of the mechanism controlling the sphincter in species of animals with a gall-bladder.

REFERENCES.

1. Archibald, E. A New Factor in the Causation of Pancreatitis. Tr. Internat. Cong. Med., 1913, Lond., 1914, Sect. VIII, Surg. pt. 2, 21-27.
2. Bainbridge, F. A., and Dale, H. H. The Contractile Mechanism of the Gall-Bladder and Its Extrinsic Nervous Control. *Jour. Physiol.*, 1905-06, XXXIII, 138-155.
3. Barker, M. R. What is the Function of the Gall-Bladder? And Why the Folds of Heister in the Cystic Duct? *Med Record*, 1907, LXXII, 555-558.
4. Eisendrath, D. N., and Dunlavy, H. C. The Fate of the Cystic Duct After Cholecystectomy. An Experimental Study. *Surg., Gynec. and Obst.*, 1918, XXVI, 110-112.
5. Hendrickson, W. F. A Study of the Entire Extra-Hepatic Biliary System, Including that of the Duodenal-Portion of the Common Bile Duct and of the Sphincter. *Johns Hopkins. Hosp. Bull.*, 1898,IX, 221-232, 4 pl.
6. Herring, P. T., and Simpson, S. The Pressure of Bile Secretion and the Mechanism of Bile Absorption Obstruction of the Bile Duct. Proc. Roy. Soc., Lond., 1907, LXXIX, Series B., 517-532.
7. Hutchinson, W. Is the Gall-Bladder as Useless as It Is Dangerous? *Med. Record*, 1903, LXIII, 770-773.
8. Judd, E. S. Cholecystitis; Changes Produced by the Removal of the Gall-Bladder. *Bost. Med. and Surg. Jour.*, 1916, CLXXIV, 815-825.
9. Judd, E. S., and Mann, F. C. The Effect of the Removal of the Gall-Bladder. An Experimental Study. *Surg., Gynec. and Obst.*, 1917, XXIV, 437-442.
10. Judd, E. S. The Recurrence of Symptoms Following Operations on the Biliary Tract. In press. *Ann. Surg.*, 1918.
11. Lieb, C. C., and McWhorter, J. E. Action of Drugs on the Isolated Gall-Bladder. *Jour. Pharm. and Exper. Therap.*, 1915, VII, 83-98.
12. Mayo, W. J. "Innocent" Gall-Stones a Myth. *Jour. Am. Med. Assn.*, 1911, LVI, 1021-1024.
13. Meltzer, S. J. The Disturbance of the Law of Contrary Innervation as a Pathogenetic Factor in the Diseases of the Bile Ducts and the Gall-Bladder. *Am. Jour. Med. Sc.*, 1917, CLIII, 469-477.
14. Mitchell, W. T., Jr., and Stifel, R. E. The Pressure of Bile Secretion During Chronic Obstruction of the Common Bile-Duct. *Johns Hopkins Hosp. Bull*, 1916, XXVII, 78-79.
15. Oddi, R., and Rosciano, G. D. Sulla Esistenza di Speciali Gangli Nervosi in Prossimità Dello Sfintere del Coledoco. Monitore Zool. Ital., Firenze, 1894, V, 216-219, 1 pl.
16. Okada, S. On the Contractile Movement of the Gall-Bladder. *Jour. Physiol.*, 1915-16, L, 42-46.
17. Rost, F. Die Funktionelle Bedeutung der Gallenblase. Experimentelle und Anatomische Untersuchungen nach Cholecystektomie. *Mitt. a. d. Grenzgeb. d. Med. u. Chir.*, 1913, XXVI, 710-770.
18. Scammon, R. E. On the Development of the Biliary System in Animals Lacking a Gall-Bladder in Postnatal Life. *Anat. Record*, 1916, X, 543-558.
19. Werelius, Axel. Suction-bulb Action of the Gall-Bladder. *Surg., Gynec., and Obst.*, 1917, XXV, 520-521.

TABLE 1.

This table shows the great variation in the dimensions of the different component parts of the biliary tract in different species and individuals.

A. Showing the average of the dimensions in various species.

	Weight.	Diameter common duct.	Length common duct.	Diameter cystic duct.	Length cystic duct.	Capacity Gall-bladder.	Distance pylorus to opening of common duct.
	Kg.	mm.	mm.	mm.	mm.	cc.	mm.
Dogs—Average weights and measurements of 29 animals	8	2.9	57.6	2.2	18.6	16.6	38
	Gm.						
Monkeys—Average weights and measurements of 14 animals	1722	3	23.5	2.2	12.2	2.3	20
	Gm.						
Rabbits—Average weights and measurements of 30 animals	1752	2.2	35	1.4	18.7	1.6	7.3
	Gm.						
Guinea-pigs—Average weights and measurements of 16 animals	437	1.8	12.6	1.1	11.2	.8	5.6

TABLE 2.

This table shows the comparative length and diameter of the common duct in adults of species with a gall-bladder (ex. rabbit and guinea-pig) and species without a gall-bladder (horse, rat, pocket gopher). Note that the dimensions of the common duct vary in different species, regardless of whether a gall-bladder is present or not.

Species.	Length of Common Duct.	Diameter of Common Duct.	Distance of pylorus to point of entrance of common duct into duodenum.
Ox	4-7 cm.	7–8 mm.	50–70 cm.
Rabbit	2–5 cm.	1.5–3.5 mm.	0.5–1.5 cm.
Guinea-pig	1-2 cm.	1.5–2.5 mm.	0.4–08 cm.
Horse	4-6 cm.	10–20 mm.	10–20 cm.
Rat	2-3 cm.	0.6–1.0 mm.	1.5–2.5 cm.
Pocket gopher	6-7 cm.	0.6–1.0 mm.	4–5 cm.

TABLE 3.

Table showing the maximum secretory pressure of the liver in three species of animals, one of which does not possess a gall-bladder (rat).

	Rabbit.		Guinea-pig.		Rat.	
No.	Wt.	Secretory Pressure.	Wt.	Secretory Pressure.	Wt.	Secretory Pressure.
1	2000	308	775	200	190	225
2	2275	245	707	210	160	200
3	2155	250	755	218	180	215
4	1765	240	480	190	190	225
5	2440	225	540	195	165	230
	2127	253.6	651.5	202.6	177	219

TABLE 4.

This table shows the relationship between rate of bile-flow and capacity of the gall-bladder in two species. The collections of bile were made while the animal was under anesthetic and the rate of bile secretion probably much decreased. Even under these conditions the gall-bladder never had a capacity for more than 2 per cent of the amount of bile secreted in twenty-four hours.

Animal.	Weight.	Length of time bile was collected.	Amount of bile collected.	Estimated amount of bile secreted in 24 hours.	Capacity of gall-bladder.	Percentage of bile secreted in 24 hours which the gall-bladder will hold.	Weight of liver
Rabbit	2440	2 hrs.	10.0	120.0	2.4	2.0	75
Rabbit	2275	2 hrs.	12.8	153.6	2.0	2.0	75
Rabbit	2155	2 hrs.	16.6	199.2	2.0	1.0	95
Rabbit	1765	2 hrs.	9.0	108.0	1.4	1.3	65
Average	2158.8			122.7	1.95	1.4	71.25
Guinea-pig	707	2 hrs.	5.0	60.0	0.8	1.3	32
Guinea-pig	560	2 hrs.	6.5	78.0	0.8	1.0	40
Guinea-pig	652	2 hrs.	8.5	102.0	1.2	1.0	32
Guinea-pig	390	2 hrs.	4.4	52.8	0.6	1.1	20
Average	561.8			73.2	8.85	1.1	31

TABLE 1—Continued.

B. Showing individual weights and measurements of five animals of each species selected from the preceding subdivision "A" on account of their being the nearest in size in each group.

	Sex.	Condition.	Weight, kg.	Diameter common duct, mm.	Length common duct, mm.	Diameter cystic duct, mm.	Length cystic duct, mm.	Capacity gall-bladder, cc.	Pylorus to opening c. d., cm.	Weight of liver, gm.
Dogs.	M	Thin	14	3	57	2.5	27	20	43	420
	M	Thin	13.2	2.5	70	2	22	17	55	440
	F	Good	9.8	3	57	2.5	15	9	42	340
	F	Good	9.1	3	60	2	17	14	45	470
	M	Good	8.1	2.5	65	2	11	12	40	350
		Average	10.8	2.8	61.8	2.2	18.4	14.4	45	404
			Gm.							
Monkeys.	F	Thin	2050	3.5	26	3	18	2	20	95
	F	Thin	2040	3	37	2.5	14	2.6	25	80
	F	Thin	1890	3	16	3	11	1.5	21	80
	F	Thin	1650	3	35	2	12	3	10	70
	F	Thin	1575	3	28	2	8	4	24	50
		Average	1841	3.1	28.4	2.5	12.6	2.6	20	71
			Gm.							
Rabbits.	M	Good	2385	2.5	37	1.5	25	3.6	8	83
	F	Good	2335	2	47	1.5	21	2.2	10	85
	F	Good	2280	2.5	40	2	16	3.2	6	105
	M	Good	2275	2	40	1.5	12	2	8	60
	M	Good	2150	2.5	45	2	24	2.5	6	110
		Average	2705	2.3	41.8	1.7	19.6	2.7	8	88.6
			Gm.							
Guinea-pigs.	M	Good	775	2.5	15	1.5	12	1.2	8	44
	M	Good	755	2	20	1	11	1	6	33
	M	Good	707	2	20	1.5	10	.8	6	32
	M	Good	652	2	18	1	10	1.2	5	32
	M	Good	560	2	12	1.5	12	.8	5	40
		Average	689.8	2.1	17	1.3	11	1	6	36.2

DISCUSSION ON THE PAPER OF DR. MANN.

Dr. William H. Harris, New Orleans: I would like to ask Dr. Mann if the question of supply and demand in the incidence of physiology plays some part in herbivora or carnivora, and whether they have a gall-bladder or not? Also, whether the question of a constant feeder or intermittent feeder there has any relationship to the presence of the gall-bladder or to the actions of the gall-bladder?

Dr. F. C. Mann, Rochester, Minn. (closing): In answer to the question of Dr. Harris, it is not absolutely true, but in general all carnivora, both animals and birds, possess a gall-bladder, and that species of animals which do not possess a gall-bladder mainly belong to the herbivora group. There are a few species that I do not recall at present, namely: carnivora, which do not have a gall-bladder, but in general it is true.

In regard to constant and intermittent feeders, there is no definite differentiation between the two. It may be that if we could trace each species back far enough, we would find that intermittent feeders do not possess gall-bladders. However, I am not able to state definitely in regard to that, but just in reviewing them as species we cannot differentiate them now.

IMPORTANT FACTORS RELATIVE TO TUBERCULOSIS IN ARMY AND CIVIL PRACTICE.*

By WALLACE J. DUREL, M. D., New Orleans, La.

In order to arrive at some definite conclusion in the prevention, diagnosis and treatment of pulmonary tuberculosis it is of primary importance to remember that the stage and course of the disease depends upon the relation between the virulency of the invading tubercle bacilli and the resistance of the body's humoral and cellular tissues.

The efficacy of the body's resistant forces in the phagocytic and antibody action of the leucocytes will prove the decisive factor in the outcome of a tuberculous infection; in limiting the disease to small areas of infiltration, exudation and tubercles, or in permitting a greater involvement of lung areas, with rapid disintegration and cavitation.

The individual with a low tissue resistance will show more confluent lesions and rapid disintegration, with marked constitutional disturbance, if the invading tubercle bacilli are of a virulent type, while one with a good tissue resistance will show benign lesions, not tending to activity and disintegration, if the invading tubercle bacilli are of a lesser virulent type.

* Read at the 39th Annual Meeting, Louisiana State Medical Society, New Orleans, April 16, 17, 18, 1918.

Variations between these two conditions of infection will account for the different courses of the disease manifested by localized foci, with no clinical symptoms (inactive tuberculosis) or by more disseminated lesions with evident clinical symptoms (active tuberculosis).

This leads us to the prevention of tuberculosis by the strict adherence and enforcement of our sanitary laws and by the education of our people as to a proper "mode of living" in order to prevent infection from man to man and to increase the individual's resistance to suppress the multiplication of the tubercle bacilli.

The individual who can live a proper anti-tuberculosis life, in the right environment, runs very little chances of ever developing tuberculosis. In civil life this is a hard task with many, but in army life it becomes almost impracticable, with the underground method of the present warfare.

Thus, depending upon the tissues', local and general, resistance, we find tuberculous exudates, infiltrations and tubercles localized in the peri-bronchial and bronchial glands, or extending into the bronchial tree, or still further extending into the bronchioles and alveolar surface of the lungs.

These limited and more extensive lesions may remain *statu quo* for years, without revealing the least sign of activity or disintegration.

Still, after many years, and in a great number of cases after having been thus encapsulated since early childhood, inactive tuberculosis, following a defective "mode of living," bad environment, disease, dissipation, overwork, worry, etc., flares up into the most active forms of the disease—pneumonic phthisis and miliary tuberculosis.

The opinion of many phthisiologists, "that tuberculosis is a disease, in a great number of cases, contracted during childhood," has been repeatedly corroborated by numerous observers from our best tuberculosis clinics.

That tubercles, caseous and calcareous, quiescent and not healed, may remain encapsulated for many years in the lung without revealing any constitutional symptoms of disease, though showing evidence of their presence in the lung by physical and X-ray findings and the tuberculin tests, we know to be an established fact. And we further know that there are no measures by which we can positively assert that such lesions will remain indefinitely encap-

sulated in this inactive state and will not finally impair the individual's health.

Inactive foci may become active at any period of a man's life, and death will often be the final ending of what was thought to be an inert condition. Therefore, it is the opinion of most phthisiologists that tuberculous individuals should be more cautious in their "mode of living" and should not be subjected to the exposure and hardships of a strenuous civil or army life. Such individuals should not be forced into a very active military service.

In making a diagnosis of pulmonary tuberculosis it is not sufficient to locate the presence and extent of lesions, but we must first determine the tuberculous nature of these lesions, especially relative to their "activity" or "latency."

The diagnosis of incipient or advanced tuberculosis cannot be made upon the physical lung-findings alone. Any one claiming to do this is a medical phenomenon. The presence of râles alone is not the sole criterion of the presence of tuberculosis or of active lesions. Therefore, we are better able to arrive at some conclusion in the diagnosis of pulmonary tuberculosis by obtaining a chain evidence of the following factors:

1. The physical findings.
2. The family, personal and clinical histories.
3. The sputum findings.
4. If tubercle bacilli are not found in the sputum, positive tuberculin tests and X-ray findings will be valuable corroborative factors.

Always inquire into the family history as to direct and constant exposure to infection; into the personal history as to dissipation, overwork, infectious diseases, environment, habits, etc. Into the clinical history as to:

1. Range of temperature (97° F. to 99.6° F or 100° F.) determined by a two-hour temperature record of at least five days.
2. Acceleration and instability of the pulse—92 to 120.
3. Disturbed digestion and loss of weight.
4. Mâlaise and languor, with aching and lassitude.
5. Cough and hemoptysis.
6. Low blood pressure.

Activity of the disease is chiefly determined by the above factors.

As for the physical lung-findings: Lack of expansion of the upper lobe of the lung, slight dullness or tympany, increase of voice sounds, feeble breathing, harsh and granular breathing, rumbling and prolonged expiration; dry, whistling, localized râles, etc., may

only indicate a "quiescent," partly fibrous and inactive lesion, but when associated with the above-mentioned clinical symptoms they can well be interpreted as indicating "active" tuberculosis.

This is especially true if the subcutaneous tuberculin test causes a positive constitutional and focal lung reaction, and if the X-ray shows any feathering extending well into the cortex of the lung.

The tuberculous nature of a lung lesion cannot be disclosed by even the closest and most careful lung examination alone. The physical findings detected by a percussion and auscultation may be caused by an absolutely non-tuberculous lesion. No physical lung-findings, including moist râles, are a specific indication of "active" tuberculosis.

If the sputum is negative—a fact which does not exclude tuberculosis even after repeated examinations of twenty-four-hours specimens—it is essential to have such corroborative evidence as the tuberculin tests and the X-ray before a positive diagnosis of tuberculosis can be made. The X-ray will give the location and the topographical distribution of the lesions, also the degree of infiltration and calcification of the tuberculous foci. However, it is impossible to determine by plate and skiagraphic readings the tuberculous nature of the lesions, and especially whether they are "active" or "latent."

The "positive" tuberculin skin tests will show whether the subject harbors in his body any tuberculous foci. It does not, however, express the "activity" of the infection.

The "positive" subcutaneous tuberculin test will denote whether the tuberculin antigen and antibodies are easily accessible to the tuberculous foci—*i. e.*, to lesions not properly walled in by a sufficient protective barrier of fibrous tissue.

A "focal" lung reaction, accompanying the "positive" constitutional tuberculin reaction, gives a fairly good evidence of the "activity" of the disease.

A twice or thrice "negative' tuberculin skin test gives absolute proof of the complete absence of any tuberculous foci, whether "active" or "latent," excepting in subjects suffering with some acute toxemia or infection, as measles, etc., or with far-advanced or miliary tuberculosis and pneumonic phthisis.

The few who contend that 10 per cent of the cases admitted in tuberculosis sanatoria are non-tuberculous because the examiner, in the absence of moist râles, has exaggerated the importance of the harsh and granular breathing and prolonged expiration found in

the upper lobe of the lung, do not realize that it might be better understood to mean a lack of application of the proper methods in the diagnosis of pulmonary tuberculosis. Certainly we should not conclude our diagnosis upon the above physical findings alone, but we should, however, never overlook their significance. This seems more plausible, as shown by the reports of tuberculosis sanitoria, stating that 70 to 85 per cent of cases referred to such institutions are in the advanced stages of the disease.

It is far better, after all, to admit a few borderline cases without râles and extensive consolidation—*i. e.*, those giving physical findings which are recognized by the highest authorities on the subject as that of incipient tuberculosis—than to run chances of the few cases becoming advanced. By so doing, we do not injure any one, but will reduce the morbidity of tuberculosis in our State and nation.

If we have the high prevalence and mortality of tuberculosis it is because, unfortunately, we overlook these "signs" of incipiency and often wait too long for the appearance of the more advanced physical findings: moist râles and tubercle bacilli in the sputum. The same applies to tuberculosis in civil life as to tuberculosis in army life. The man wearing a uniform is no less susceptible to tuberculosis than a civilian.

If we are not careful, and we send to the trenches men with definite lesions of incipient tuberculosis (lesions without moist râles, but corroborated by clinical, X-ray or tuberculin findings) it will mean disaster and countless expense to our national and civil governments. What greater injustice can we do to our young men than to send "in line of duty" a tuberculous individual who, with all chances against him, is inevitably doomed to succumb to the strenuous life and exposure of the damp and muddy life of trench and underground warfare? Reports from abroad show that strong and healthy men return from such exposure and environment depleted and exhausted. What, then, can we expect of the poor tuberculous soldier, coming from this dungeon, breeding the very essentials for the making of the consumptive? Let us be very careful in our examinations for the detection of tuberculosis in our army.

There is no rule by which we can say that one with an apparently "healed" lesion is fit for service in our present army. Nothing tells us when such an individual will fail in health and become a menace and a charge to our government.

Tuberculous lesions are not "healed" as long as they encapsulate caseous material containing tubercle bacilli. Only lesions "healed"

by complete fibrosis, with no caseation, can we consider well and cured.

In my opinion, most cases of far-advanced tuberculosis and of pneumonic and miliary phthisis are nothing more than an acute exacerbation and extension of long-standing and apparently "healed" foci.

Are we going to run the chances of having our young men develop the more rapid forms of the disease by sending them to a bad environment and dangerous "mode of living"? Oh, no! There are enough healthy and non-tuberculous men in our great United States, who are better able to stand the physical exertions and privations of trench warfare and who can better fill all the ranks in both civil and army exigencies.

In civil practice we must pay more attention to our younger and growing generation, to our working, factory and tenement population, and, in fact, to all classes, thus educating them to a proper anti-tuberculosis "mode of living," and also providing them with sanitary factory, shops, school houses, dwelling houses, better food and rest hours, farms and open-air life, etc., all these factors tending toward the suppression of infection by the tubercle bacilli and the increase of the body's immunity against the virulency of the tubercle bacilli.

What are we to do with the "latent" and "active" tuberculous? Should they both be treated alike? No! The "inactive" or "latent" tuberculous can safely keep his usual work or occupation, and need not be restricted to any severe or sacrificial home or sanatorium treatment. However, he must be made to fully realize that he is not a sound man and that he will fail in health if he attempts to follow the career of one who is absolutely free from any tuberculous focus or infection. He must be instructed to carry out a proper anti-tuberculous life by modifying his way of living and by correcting his faulty habits, by insisting upon an open-air life in a favorable environment, by taking a well-regulated and balanced diet, by carefully avoiding excessive exercise and exertion, and by observing certain periods of rest. "Early to bed" should be his motto. Any secondary disease condition should be corrected, and, with the above, will be found sufficient, in the majority of such cases, to completely eradicate the "latent" tuberculosis and thus prevent further "activity" of the disease.

Let us bear in mind that the "latent" or "inactive" tuberculous is not a sound man, though he does not show symptoms of disease.

The "active" tuberculous, contrary to the "latent," requires very aggressive methods of treatment, such as absolute rest in bed, careful dieting, abundant open-air life, and such accessories as creosote, iodin, tuberculin, artificial pneumothorax, etc. He cannot work and follow his usual occupation, but he must submit to a strict and disciplinary form of treatment, at home or in a sanatorium.

I will ask this question: If what we said is true of the "active" and "latent" case of tuberculosis in civil life, is it not the same with the individual in army life? Both are susceptible to the same favorable and unfavorable environment and "mode" of living, according to their station and the exigencies of duty and necessities of life.

I cannot feel that the "latent" tuberculous soldier is fit for line of duty. He can, however, be well utilized in the army in some capacity where he will not be exposed to the hardships and fatigue of the strenuous army life. This way he will not become a charge to himself, the government or the public.

The "active" incipient tuberculous, without râles and tubercle bacilli in the sputum, as well as the more advanced tuberculous, should be entirely rejected or discharged from the army.

Discussion on the Paper of Dr. Durel.

Dr. C. P. Gray, Monroe: There are four points I would like to discuss briefly. The first point is the timeliness of this paper of Dr. Durel's and the manner in which he has covered it in the length of time at his disposal. I do that, for the reason, as he mentioned, of the army and draft examinations, especially at this time, not that it will not be important in the future, but at this time we should all consider the importance of this paper and the message which Dr. Durel has tried to give us in the length of time at his command.

The next point which I would like to call attention to, and Dr. Durel mentioned it, but did not emphasize it sufficiently, is the diagnosis. It is surprising and astonishing to know the large number of physicians who wait, not only for moist râles, but all kinds of râles, to appear in the lungs before they consider a diagnosis of tuberculosis. Dr. Durel has stated that 40 or 60 per cent of the cases he examined of supposed tuberculosis proved not to be such, but the majority of those cases developed tuberculosis and might have it in the active form. I have been quite as guilty as others, because at the time I accepted the creosote and forced egg feeding of tuberculosis I did the same thing. I would wait for all manner of symptoms to develop in the lungs before I would entertain the idea of tuberculosis.

Why is it that so many beginning active cases of tuberculosis are passed over, and how many cases are we passing over as heart disease, as stomach disease, as malaria, and so on? Why? Because we do not find the râles in the lungs, because the patient has a rapid heart action, because he has gastric symptoms, and because he has a slight rise of temperature in the afternoon, and you generally know that that is true.

In the majority of cases in the beginning, unless we avail ourselves of the other methods of diagnosis, hundreds of these cases are passed over and given a general diagnosis of malaria, heart disease or indigestion.

A third point I want to mention is with reference to army examinations. In cities the size of New Orleans it is much easier to make these examinations and be more safe about the men going into the trenches who have active tuberculosis. But what are we going to do in our smaller cities, like Alexandria, Baton Rouge, Shreveport, Monroe, etc.? The doctors in these smaller cities are literally swamped with work, and how are we going to detect these cases that Dr. Durel mentioned to you. Unless these men have these active signs and a stethoscopic examination is made we are bound to accept them. I do not think the Surgeon General's office has placed sufficient stress upon that one point, and I do not say it in a spirit of criticism. I believe that a larger and a wider provision should have been made for the tubercular examinations, or rather for test examinations. As it stands at present, we have to do just as Dr. Durel mentioned.

My fourth point is in the form of a question I would like to ask Dr. Durel to answer in closing the discussion, namely: what he said about the three negative skin tests. I did not quite catch what he said regarding that matter.

Dr. Wallace J. Durel, New Orleans (closing): I am sorry if I did not voice the feeling and sentiment of the general practitioners in regard to this subject, because they are the ones that have got to solve the problem. Tuberculosis must be solved by the general practitioner. Unfortunately, however, tuberculosis gets the least thought from the general practitioner. The tuberculous patient is the last to be thought of.

Relative to Dr. Gray's question concerning moist râles in the lungs, I assure you that we were greatly embarrassed in our army examinations. You will see a complete report in the "Southern Medical Journal," where I stated the exact facts and the conditions under which we were placed in our army examinations. In our army examinations we were given three minutes to make a diagnosis of tuberculosis, and also three minutes in which to make a diagnosis of cardio-vascular conditions. Gentlemen, I could not do it. Army experts may make diagnoses in that length of time, but I cannot do it.

In an individual not suffering from any toxemia or an acute infection, acute miliary tuberculosis or pneumococcus phthisis, excluding the factors I have mentioned, it means the complete absence of any tuberculous focus, whether active or latent, in that individual. In fifteen years' practice in this line of work exclusively I have not yet seen an individual who had symptoms of tuberculosis, with perhaps no bacilli in the sputum, with negative tuberculin test, with repeated negative skin tests, who did not have, sooner or later, active tuberculosis. I would not pass on any individual unless I had this chain of evidence. I must have the physical findings: I must have by clinical findings; I must have my clinical history, personal and family history; I must have my X-ray findings; I must have my tuberculin findings. You may have the physical findings, you may have the clinical and X-ray findings, which simulate tuberculosis due to other conditions than tuberculosis, and your tuberculin test may be negative. If that happens, regardless of what is said against it, I have never regretted telling such an individual he had not tuberculosis, but I have had cases where I was in doubt whether I could tell the individual he had tuberculosis or not unless I got a positive tuberculin reaction. Then, if I get a positive tuberculin reaction and positive subcutaneous test,

and if there was a constitutional reaction plus a focal lung reaction, I would advise that patient to keep on with his work and mode of living. The active cases must be put under strict treatment.

At one of the army camps we were given greater liberty in using the X-ray. We were limited to the X-ray. We were in the beginning not allowed to take any history.

As to sputum examinations, the applicant might deceive the pathologist. This is what was done: The applicant was furnished a cup and asked to spit into it and the sputum was examined. Unless you get a twelve- or twenty-four-hour specimen of sputum in a doubtful case your sputum examination is worth nothing.

As far as the tuberculin test was concerned, it was prohibited. What has been the result? I have seen in the last two months a case in which a diagnosis of tuberculosis was made and the man was discharged as absolutely non-tuberculous. I have seen other cases that were accepted for duty where, after a few weeks or months, they developed hemorrhage and active tuberculosis. I am glad to say, however, that some improvement has been made. Major Bruns, who has charge of the work, has made wonderful changes for the future examination of men for the army, and I am sure in the next examinations such difficulties as I have mentioned are not going to be met with.

I repeat again, before making a diagnosis of tuberculosis, do not depend upon the lung-findings alone. Any one with a stethoscope can make a diagnosis of tuberculosis. You must have other clinical findings, tuberculin findings, X-ray findings, and so on. It is as much an injustice to tell an individual he has tuberculosis when he has not as it is to tell another individual he has not tuberculosis when he really has it.

ACUTE NEPHRITIS IN CHILDHOOD.*

By SOLON G. WILSON, M. D., New Orleans.

The picture of acute nephritis is indeed familiar to us all. It is a subject that has never lost its interest to the medical profession; consequently in presenting this paper the writer expects it to be discussed from every angle.

We have come to know in recent years that nephritis in childhood does not carry with it the same grave outlook that it did formerly, but instead of feeling that we are dealing with a hopeless situation, as was the case in the past, it is the usual thing to-day to expect most of our cases to get well. It is largely due to Fisher's Treatise on Acidosis that this change of opinion has come about.

In the condition of acidosis where there is a diminution of the alkali reserve of the body fluids, especially of the blood, usually at-

* Read at the 39th Annual Meeting, Louisiana State Medical Society, New Orleans, April 16, 17, 18, 1918.

tended by an excessive formation of acids with its resulting clinical symptoms.

In other words, an alteration of the equilibrium and normal relationship of the alkalies and acids in the body. The blood, in order for life to exist, must be maintained at a very constant reaction, which is slightly alkaline, and there must be within narrow limits a certain amount of bases over acids. Any change from the normal towards the side of acidity tends to inhibit numerous sensitive metabolic processes in the organism and acidosis results.

Acute nephritis as a primary disease is nearly an unheard-of condition, but is dependent upon either chemical or bacterial irritants. In the immense majority of cases it occurs as a complication of infectious diseases, and during the diseases a condition of acidosis exists.

It is indeed a question whether it is the bacterial irritant in scarlet fever, diphtheria, tonsilitis, parotiditis, measles, malaria, influenza, varicella, general sepsis, acute intestinal infection, or the resulting acidosis, which is ever present in the diseases that are responsible for the damage to the kidneys.

There isn't any doubt that a great many cases are overlooked on account of mildness, and ultimately become serious cases. Usually the first symptoms noted are a slight puffiness about the eyes, nausea; mild frontal headaches is a frequent symptom. Elevation of temperature exists in all cases, but the most striking early symptom is scantiness of the excretion of urine. The urine voided will be reduced from a total quantity of thirty ounces to six or seven ounces. Later a few ounces only may be excreted, or the urine may be completely suppressed. Associated with this is the odor of acetone on the breath.

There is not in the entire field of medicine a place where the laboratory is a greater source of satisfaction. The finding in these cases are albumen, granular (finely granular) casts, blood acetone, indican, pus, and it is your laboratory that will assist you to intelligently know the progress of your patient's case.

Test for Indican.—A few c. c. of urine are treated with an equal volume of concentrated hydrochloric acid, to which is added two or three drops of hydrogen peroxide and the contents mixed. Two c. c. of chloroform are then added and the tube inverted several times. In this process the indican is oxidized to indigo-blue, which is taken up by the chloroform. The depth of the blue coloration of the chloroform will serve as an approximate estimate of the amount of indican present.

In absolutely normal urine no blue coloration or, at most, a faint bluish

tinge is observed. Care must be taken not to add too much hydrogen peroxide to the test.

Test for Acetone.—To a few c. c. of urine are added a few drops of fairly concentrated solution of sodium nitroprussid, or potassium hydrate, until the mixture is strongly alkaline. A ruby-red color appears in the presence of acetone. If the ruby-red solution be treated with a few drops, say one c. c. of glacial acetic acid, the first red color will change into a crimson or reddish-purple color in the presence of acetone.

TREATMENT.—The treatment of acute nephritis might be divided into the following subdivisions:

1. Drugs; 2, water; 3, diet; 4, heat; 5, baths; 6, clothing; 7, hygiene—constantly bearing in mind the acidosis.

Sodium citrates, with me, have been accorded first place, given in ten-grain doses every three hours. Sodium bicarbonate, in ten-grain doses, has served nearly as well. A patient with nephritis, it matters not how mild, should have two bowel evacuations a day, as we are trying to relieve the overworked kidneys. Milk of magnesia or citrate of magnesia answers admirably.

Water—The question of water always provokes discussion, one class urging indiscriminate water-drinking and more or less indiscriminate use of diuretics, and the other class withholding water altogether. Too great emphasis has been placed upon forcing kidneys to act and too little upon the necessity of relieving them of the work for which they are temporarily incapacitated. The advocacy of drinking large amounts of water when the blood-vessels of the kidneys are distended and the tubules are obstructed does nothing but harm. My course has been a moderate amount of Vichy or Stafford water, not attempting in any way to force the kidneys.

Diet.—In selecting a diet two factors are to be considered: First, a food to maintain your patient, providing his caloric needs; second, to provide a food that will not add to the existing trouble. In these cases there exists a tendency to an indicanuria, which serves as a direct irritant to the kidneys. Even milk contains 4 per cent proteid, and we know nitrogneous foods, such as meats and eggs, should be avoided, in order to relieve the kidneys of the work of excretion of urine and creatin. So we have to reduce the proteid of milk by giving half milk and half cereal water, never giving over twenty-four ounces of milk a day.

Carbohydrates.—Cereals, bread and butter, baked potatoes, plain gelatins, malted milk, racahout, zweiback, fruit juices are to be avoided, because of breaking up into hippuric acid, acting as a direct renal irritant. The value of salt-free diet has been generally recog-

nized. The *rationale* was set forth by Widal, Javal and others. In cases of edema it is interesting to see the swelling disappear by exclusion of sodium chloride.

It is interesting to see the rôle that heat plays in assisting in relieving the kidneys of their work by producing diaphoresis. The best method to employ is to improvise an electric light cabinet covered with blankets or, instead, hot-water bottles. A temperature of 110° F. may be maintained an hour if necessary, repeated in eight hours. In severe cases of general edema sulphate of magnesia baths at a temperature of 100° for fifteen minutes, followed by bandaging patient in a solution of Epsom salts, act most satisfactorily in reducing the swelling.

The clothing of a nephritic is most important; he should be protected from drafts. Silk or mixture of silk and wool or flannel should be worn next to the skin. While it is necessary to maintain an equal heat of about 70° F., frequent airing of the sick-room adds to the comfort of the patient.

This plan of management covers eight years, and a great many cases treated in this way are submitted for what they are worth.

Discussion on the Paper of Dr. Wilson.

Dr. L. R. DeBuys, New Orleans: There are only a few words I want to say in connection with acute nephritis in childhood, and that is, I do not think we should wait for the first symptoms of swelling, edema, headache, and so on. I know of no disease where prophylaxis is more important, and in that connection we should always bear in mind that whenever a child has a disease which predisposes to nephritis we should carefully watch the urine during the entire convalescence.

Dr. C. H. Pardue, Vivian: I would like to ask as to the general prognosis in these cases of acute nephritis in children?

Dr. Joseph O. Weilbacher, New Orleans: Corroborative of what Dr. DeBuys has said, we ought to go still further and be very careful about the kidneys of all sick children. It is peculiar how often we find that a child will develop nephritis from seemingly almost no cause, whether it be an infectious condition or not. I have particularly in mind a child of my own, who happens to be sick now, one year of age, who had a supposedly idiopathic temperature. The child would have high temperature for three or four hours, and then the temperature would be perfectly normal for about six or eight or ten hours. This condition kept up for several days. The usual routine was gone through, in the beginning, of good purgation, and pyelitis was suspected. The urine was thoroughly examined and proved to be absolutely negative. All conditions were negative for pyelitis, for indican, bile, or anything else. Forty-eight hours afterwards the urine was again examined and found negative for acetone, indican, pyelitis or pus, but it contained bile, and this latter specimen was filled with hyalin, granular casts, which brings out the point that we can never tell when a child's kidneys are going to be in-

volved. In this respect I would like to ask Dr. Wilson his opinion as to whether he thinks bile could produce a large number of casts in the urine. Remember, there was not found present any albumen—nothing but bile and casts.

Dr. J. L. Adams, Monroe: I want to relate one case in order to bring out more discussion. It is an interesting case because it came close home. We had a little girl in my town, about six or seven years of age, who, in attending school, developed some tonsillar trouble, and I, being the family physician, was called in to attend the child. I promptly reported her condition to a specialist. He came and looked at the child and said it would be necessary to remove the tonsils. Before the time arrived for the removal of the tonsils the child gave evidences of some nephritic complications, some cardiac condition, which rather contraindicated surgical interference at the time. With the assistance and advice of the specialist we postponed the operation from time to time, until the child was taken from school and confined to bed. She was kept in bed for quite a long time, with all the symptoms of an acute nephritis, both clinical and microscopical. Finally, we abandoned the idea of removal of the child's tonsils, for fear the child would die after the operation. The family became impatient, went to see another doctor, who not only advised, but removed the tonsils In two weeks' time there was a marked improvement in the child's condition, and in four weeks' time the child was back in the country again attending school. This physician was a little different from some we have had to contend with, in that he was on the square and did not do us any damage.

I report this case so that you may be on your guard in regard to focal infection. If you have any focal infection in the case of a child, look out for a nephritic condition to follow and give you trouble.

Dr. Charles J. Bloom, New Orleans: After hearing the question asked by Dr. Weilbacher, and after having followed myself for several months the question of what effect bile has on the urine, I have been watching particularly those cases where a diagnosis of chronic intestinal indigestion has been made, and where, sooner or later, there is present in the urine a large quantity of bile, with evident symptoms of jaundice. It is true, but it is only true where the bile has persisted indefinitely to cause renal irritation, such as would be expressed by the presence of casts. Bile in the urine and bile in the blood increases the blood pressure, slows the pulse, and after a time it acts as a renal irritant.

Dr. Solon G. Wilson, New Orleans (closing): I appreciate this discussion very much. I do not know that I brought out anything especially new in the paper, but I do know that when a doctor has a case of acute nephritis he has got a big job on his hands. I think it is his duty to bring into play every means at his command to assist him in watching over his patients and arriving at a conclusion.

I am thoroughly in accord with Dr. DeBuys' remarks with reference to being early in your investigation, probably going further than waiting for symptoms by anticipating your case. That method would save us a great deal of trouble and would keep mild cases mild. As I stated, lots of mild cases become severe because of not having been recognized.

Dr. Pardue asked with reference to the prognosis. I think the prognosis depends upon the early recognition of the disease. I believe if these conditions are recognized early there is no reason why all of them should not get well. We have come to feel to-day that a case of acute nephritis should get well, and when they do not get well we wonder the

reason why, and the answer is probably because they are not recognized early enough.

Dr. Weilbacher asked a question which I am not prepared to answer, with reference to bile. I should say bile probably produces irritation of the kidney. I know that urobilinogen has that effect upon the renal organs, and I have no doubt that the case he has recited was traceable to irritation of the bile.

With reference to the question of diagnosis again, it is a measure that is valuable and hard to apply to children, namely: the phenosulphonephthalein test. It is a satisfactory test to determine the possible outlook of the case. The trouble about the phenosulphonephthalein test is that its application makes the child nervous, and they won't void urine for one or two hours, and the test is dependent upon the excretion of the phenosulphonephthalein. Because of that it is not employed as in adults, but it is certainly worthy of consideration.

CLINICAL PHASES OF A CASE OF DERMAL MYIASIS.

By ISADORE DYER, Ph. B., M. D., New Orleans, La.

From notes taken over a period of two years (1914-1916), the case here reported presents several interesting and novel features.

The patient was a man of about fifty-four years of age, several years bed-ridden with asthma, rheumatism, and an associated cardiac deficiency. In the early part of 1914 Dr. Henry Bayon, of New Orleans, asked me to look after the legs of the patient. An acute dermatitis of both legs had rather rapidly given place to fungating ulcers which covered the lower two-thirds of each leg and the upper half of the dorsum of each foot. The mass of ulceration was peculiar, in that it was not uniform. In places there were rather thin crusts of honeycombed tissue, while in others there were varying sized cauliflower growths, some as large as a hen's egg. There were interstices of necrosis, with foul exudate, often covering all of the diseased area. Any part of the leg would bleed easily. There was none of the consistency of a syphilis vegetans, no resemblance to a verrucose tuberculosis cutis. The masses were too dense and aggregated for a frambesiform eruption, and there were too many irregularities in the contour and make-up of the eruption to suggest blastomycosis. Diabetic ulceration was negatived by the urinary findings.

The case was, in fact, unique, and treatment aimed at cleanliness and astringents to reduce the growth.

After several months of observation the patient called attention to several necrotic areas in which worms were present and a number of maggots were actually recovered from the tissue. In order that

these might be identified, Dr. W. V. King, qualified as an entomologist, visited the patient with the writer and his report is attached.

The case at no time was under complete control, and finally died of the associated maladies The chief interest lies in the entomological findings, which undoubtedly provoked the exaggerated lesions and maintained the disease, after the original infestation of the skin, denuded from an acute dermatitis.

MEMORANDUM ON A CASE OF DERMAL MYIASIS CAUSED BY LUCILIA SERATICA.

By W. V. KING, Ph. D., U. S. Bureau of Entomology.

In the fall of 1914 a white male patient of Dr. Isadore Dyer, residing in the City of New Orleans and affected with peculiar lesions on the lower limbs, reported that on several occasions at intervals of about two weeks he had noticed fly maggots in the dressings as they were removed from the legs and emerging from lesions themselves. At. Dr. Dyer's request a number of the maggots were saved in a bottle of alcohol, and upon subsequent examination proved to be muscid fly larvæ in two stages of development—a few fully developed and many very young ones. These were later determined by Mr. Nathan Banks, of the U. S. Bureau of Entomology, as a species of the genus **Lucilia.**

In December, 1914, in company with Dr. Dyer, I visited the residence of the patient and examined the lesions. No larvæ were present at this time, but it happened that, upon searching the premises, numerous "green bottle" flies were noticed about the yard and around the outside of the house. Several specimens of the flies were collected and later submitted to Dr. C. H. T. Townsend, who determined them as **Lucilia cæsar, L. pilatei** and **L. sericata.**

At this time the patient was requested to save any larvæ that might subsequently appear in the lesions, in order that the exact species responsible for the infestation might be determined. In May, 1915, a few fully-developed larvæ emerged, which, upon being placed in bottles of moist sand, soon pupated and some time later emerged as adult flies. These were determined by Dr. Townsend as **Lucilia sericata.**

The blue and green bottle flies of the genus **Lucilia** are of common occurrence in the United States, but are ordinarily outdoor flies and enter houses only when weather conditions are unfavorable to them. The larvæ are found usually on fresh or decayed meats and carrion, also in decomposing vegetables and in excrement, and, in fact, have habits almost identical with those of the common blow-flies, **Calliphora.**

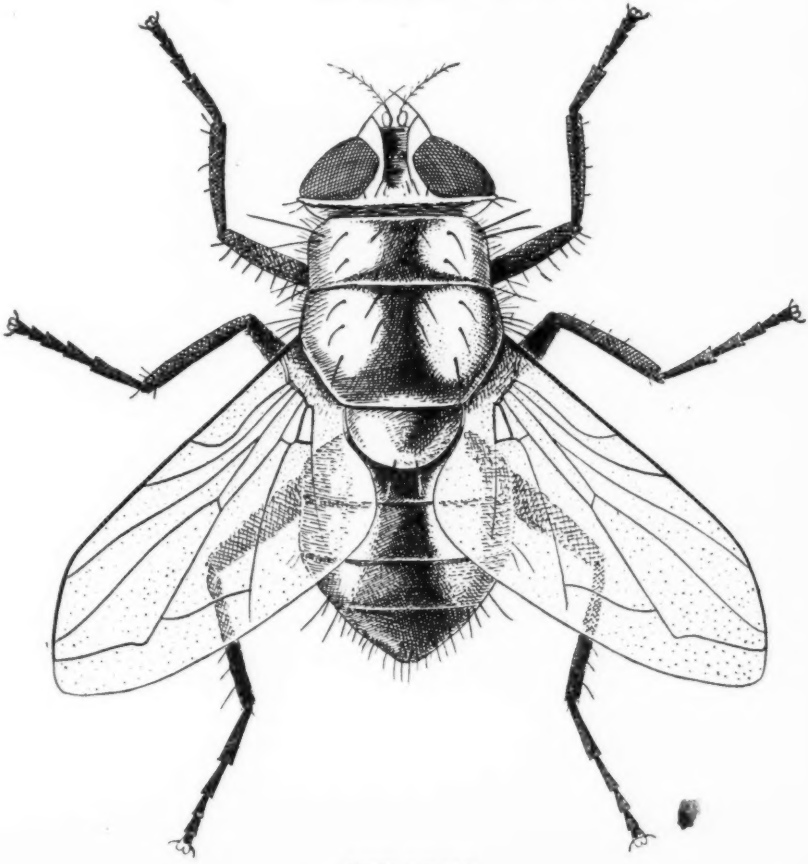
The species **L. sericata** and **cæsar** are widely distributed throughout the world, and in England and parts of Europe are known as the sheep-maggot flies. With their acquired habits of infesting, under certain conditions, the wool and flesh of sheep, they, particularly **sericata,** are responsible for great losses in the sheep industry.

Exact records of the occurrence of **Lucilia** larvæ in human cases of dermal myiasis are not common in the literature, although general statements to the effect that they are responsible for this form of infestation are frequent.

Meinert recorded the rearing of **Lucilia nobilis** from larvæ taken from the ears of a sailor (Banks, 1912).

Austen (1912) recorded the history of a case, as described by Dr. F. W. Andrews, in which hundreds of maggots were found in a chronic ulcer on the lower part of the leg of a patient who has suffering from chronic Bright's disease and dropsy. The larvæ, according to the report, had made a pretty clean dissection of the tibialis anticus and other muscles over the floor of the ulcer, which was some three or four inches in diameter. Austen was of the opinion that the larvæ were either **Calliphora** or **Lucilia.**

MacDougall (1909) found that in cases of sheep infestation the cycle of development of **Lucilia sericata** occupied about four weeks. The eggs hatched in twenty-four hours; the larval period lasted about fourteen



(AFTER HOWARD.)

days, after which they dropped to the ground, and in about fourteen days more emerged as adult flies.

Bishop (1915), from observations made in Texas, found that the developmental period from the egg to the emergence of the adult **Lucilia sericata** ranged from nine to twenty-one days and of **L. cæsar** from eleven to twenty-four days.

The case of infestation with **L. sericata** coming under our notice differs in several points from any I have found described in the literature. The peculiar nature of the lesions, unfeatured, as they were, by ulceration, which is the usual condition accompanying or inducing fly infestation; the extended period over which the larvæ recurred in the lesions, although during all this time the affected parts were kept in dressings and bathed daily with antiseptics; the fact that the repeated infestations did not cause destruction of the tissues, were all important features of the case.

REFERENCES.

Austen, Ernest E., 1912. British flies Which Cause Myiasis in Man. Repts. Local Gov. Board on Pub. Health and Med. Subjs., N. Ser. No. 66.
Banks, Nathan, 1912. The Structure of Certain Dipterous Larvæ, with Particular Reference to Those in Human Foods. Bull. U. S. Dept. of Agri., Tech. Ser. No. 22.
Graham-Smith, G. S., 1914. Flies in Relation to Disease—Non-bloodsucking Flies. Cambridge, Univ. Press.
Hewitt, C. Gordon, 1914. The House-Fly. Cambridge, Univ. Press.
Howard, L. O., 1900. A Contribution to the Study of the Insect Fauna of Human Excrement. Proc. Wash. Acad. of Sci., II, 541-604.
MacDougall, R. S., 1909. Sheep Maggot and Related Flies. Their Classification, Life-History and Habits. Trans. Highland Agric. Soc., Scot., pp. 135-174.

SOCIETY PROCEEDINGS

REVIEW OF THE SESSIONS OF THE SECTION ON SURGERY, GENERAL AND ABDOMINAL, MEETING OF THE A. M. A., CHICAGO.

Reported by DR. H. B. GESSNER, New Orleans.

The sessions were held in the Auditorium Theater, Congress street. Dr. E. Starr Judd, Rochester, Minn., presided in the uniform of a major in the Medical Reserve Corps; he is director of the special schools for military surgeons. The acting secretary, Dr. Geo. P. Müller, of Philadelphia, was unusually efficient in the performance of his duties.

The first session, Wednesday, June 12, Dr. Truman W. Brophy, of Chicago, the dean of oral surgeons in this country, read a paper on "Congenital Cleft Palate and Harelip." He made mention of an artificial velum of rubber to be used in nourishing cleft-palate babies, whether with the breast or with a feeding-bottle. Early operation,

within one month, was urged by him. Dr. Brophy believes that there is nearly always enough bone in these cases. He advocates (1) union of the bony palate and normalization of the nose; (2) union of the lips six weeks later; (3) union of the soft palate subsequently, before the fourteenth month—*i. e.*, before speech develops. Removing protruding pre-maxillary bones he condemns strongly. Under technic he referred to a small, straight needle with eye in point, as a new development used for carrying silver sutures through the bone.

Dr. A. J. Ochsner (Chicago) paid a tribute to Dr. Brophy's valuable work in the development of palate plastics. He emphasized the consideration of function, saying a palate after operation may look well and be useless for speech. Often an artificial palate permits better speech than an operated one. Uniting the bones lowers them, makes the soft parts more ample. In the after-treatment these patients must be trained to speak, a new language often serving as an excellent means for this purpose. He stressed the value of acclimatizing babies brought from a distance before operating on them and the need of patience.

Sir Arbuthnot Lane (England) made the interesting statement that his youngest patient had been a seven months' baby, within one or two hours after its removal from the uterus; there was no shock at this early period. He referred to the method practiced by him—overlapping muco-periosteal flaps—as affording opportunity for the production of new bone. In war injuries by projectiles, the same principle had been employed.

Dr. Charles Mayo (Rochester, Minn.) brought out the fact that all human anomalies of development are normal to a lower type of life. He also referred to changes in the chemistry of the amniotic fluid as influencing in an important degree the development of the fetus.

Dr. John B. Roberts (Philadelphia) expressed the opinion that selective work must be done, no one method being suited to the fifteen varieties of cleft-palate.

Dr. Brophy, closing the discussion, said there was one phase of the Lane operation he had never been able to understand—*i. e.*, how, when the tissues were turned over, the mucous membrane upward, there could be bone production. He admitted that rarely there might be lack of tissue, but insisted that usually it was sufficient.

Dr. Charles H. Mayo (Rochester, Minn.) presented a paper on "The Principles of Thyroid Surgery." He referred to the active circulation of this gland, which—only one ounce in weight—has all

the blood in the body pass through it in one hour. He dwelt at some length on the chemical substance isolated as the essential thyroid product, thyroxin, for which we have to thank Plummer and Kendall. It governs the speed of energy production in the body. The importance of laryngoscopic examination to determine the degree of interference with the recurrent laryngeal nerve of either side was brought out. Reference was made to the fact that the parathyroids control the elimination of nitrogen from the body. The essayist concluded with the statement that 70 per cent of goiters are cured by operation.

Dr. Donald Guthrie, of Sayre, Pa., read a paper on "Temporary Loss of Voice Following Thyroidectomy." He enumerated, as causes of this condition, trauma to the recurrent nerve (pinching, tying, stretching, pressure by blood-clot), trauma to the larynx and trachea, lues and hysteria. The statement was made that, after ligation of the nerve, function never returns. He emphasized the importance of laryngoscopy for diagnosis and prognosis in these cases.

Dr. Edward G. Jones (Atlanta, Ga.), in his paper, "Goiter in the Southeast; A Systematic Study of 400 Cases," stated that there is less goiter in the South than elsewhere. He spoke favorably of the Gœtsch test for hyperthyroidism by the injection of adrenalin.

Sir Arbuthnot Lane protested against the treatment of end conditions in the thyroid, the spleen and the adrenals, suffering from the strain of poison conditions, while the primary cause of trouble—the large intestine—was neglected. He said the removal of this idle effluent would cause enlarged thyroids to disappear. Raynaud's disease was referred to as a disease caused by the absorption of filth through the intestines, improved within twenty-four hours by the removal of the colon. He expressed the fear that surgeons are apt to treat end results because they lose general sense of things surgical in developing special sense exclusively.

Dr. W. O. Porter expressed the opinion that there is as much reason to remove a large non-toxic goiter to prevent injurious pathologic changes as there is to remove a mole to prevent cancerous change.

Dr. Sloan called attention to the fact that some anatomists describe the left recurrent laryngeal nerve as lying deeper than the right.

Dr. C. H. Mayo, closing the discussion on his paper, brought out the fact that nature has given man an oversupply of gland tissue, citing the hypophysis, the thyroid, the parathyroids, adrenals and

pancreas as instances of this oversupply. He said that the loss of 50 per cent of the thyroid—in an adult—is insignificant, though in children it is not the case.

Dr. Edward G. Jones, closing, answered a question by stating that, in the Gœtsch test, fifteen minims of adrenalin are administered hypodermatically. If the patient is hyperthyroid, there is a marked elevation of the blood pressure, with tremor; patients complain of lack of support in the lower limbs.

Dr. Willy Meyer, of New York City, presented, under the title, Glycophilia," the disease named by Leo Burger thrombo-angiitis obliterans. The study of the blood in these cases shows no evidence of retention of nitrogen, no decrease in the alkaline reserve, but 100 grams of glucose produce a hyperglycemia. These cases, according to Meyer's views, are near-diabetics. He objects to the name thrombo-angiitis, on the ground that there are really no thrombi in the arteries, while those in the veins are secondary, and there is no true inflammatory process. These patients are dehydrated. Treatment is by a duodenal flush (ten quarts a day), according to the plan of McArthur, plus hypodermoclysis with Ringer's, Locke's and bicarbonate solutions. The result is after-restoration of pulsation where it has ceased. These cases sometimes present as many as 7,200,000 erythrocytes, 720,000 platelets. In cases of gangrene, the actual cautery is valuable; associated with plenty of water internally, it permits lower amputation than could otherwise be done.

Dr. Ralph E. Morter (Milwaukee) showed the "End-Results in Cases of Hodgkin's Disease" treated by Yates and Bunting before 1917. Ninety-one cases were reported; fourteen clinically recovered, five well in fourteen months, four under treatment, while sixty-eight patients dead (all late) showed the possibility of prolongation of life and comfort. Treatment was by elimination of portal of entry, radical surgery to reduce the amount of pathological tissue and raise resistance, X-ray, immune serum, and rest.

At the afternoon session, June 12, Dr. E. Starr Judd delivered the chairman's address on "Surgery of the Gall-Bladder and Bile Ducts." This was a most interesting review of the best practice in the diseased conditions of these organs. A noteworthy feature of the address was the reference to the oozing that takes place after some operations on the bile passages, up to eight or ten days after operation. The coagulation time of some cases is over ten minutes. Calcium is not distinctly useful. Transfusion, done before the oozing begins, is useful. After oozing begins, the best plan is to

aspirate the liver with a trocar. After a time bile drains out and this affects the bleeding favorably.

Dr. J. Shelton Horsley (Richmond, Va.) presented a paper on "The Reconstruction of the Common Duct from the Experimental Standpoint." This excellent paper showed the difficulty of such reconstruction, owing to the contraction of the tissues. The reader discussed at length the advisability of using, for such work, tissues of the immediate vicinity, on the ground of their having an immunity to the action of the irritating discharges in their neighborhood.

Dr. Le Grand Guerry (Columbia, S. C.) followed with a "Clinical Report on Reconstruction of the Common and Hepatic Ducts." The fundamental idea presented was that of mobilizing the mucosa of the duodenum so that it may be united directly to the mucosa of the hepatic duct.

In the discussion that followed, Dr. Arthur McArthur (Chicago) gave the details of a case in which he had joined the common duct to the duodenum with a rubber tube. The duct end had to be everted so as to make a cuff, then he everted this cuff in turn so as to make quite a flange; the duodenal end he had made quite long (several inches), so that its weight could ultimately carry it into the bowel. The operation was successful. He believed that the tube had remained *in situ* long enough to permit epithelium from the duct and duodenum to line the passage in which it lay.

At the morning session of Friday, June 14, the first paper was that of Dr. Hermann B. Gessner (New Orleans), entitled "The Therapeutics of Tetanus." Basing his statements on a study of 427 case reports from the Charity Hospital of New Orleans for the years 1906-1917, he eliminated fifty-nine cases for various causes leaving 368 authentic cases on which to base his conclusions. It was shown that the mortality was least in children receiving serum in large doses by the intravenous, subarachnoid, intramuscular and intraneural methods. The final conclusions were these:

1. All cases of accidental injury of a punctured, lacerated, crushed or gunshot character, especially when associated with foreign bodies or with exposure to street, garden or stable contamination, should receive 1,500 units of antitetanic serum at the first treatment.

2. All cases of this kind coming secondarily under observation should receive the serum, though several days have elapsed.

3. If, in this class of cases, suppuration continues, the serum should be repeated at intervals of ten days, as we have reason to believe that its protective influence does not last beyond this time.

4. Cases coming under treatment for tetanus should be isolated in quiet, comfortable rooms, under the care of surgeons and nurses interested in their treatment and confident of improving on past results by devoted attention.

5. Treatment should be by large doses of serum, not less than 10,000 units. Administration by the intravenous, intraneural, intramuscular and subarachnoid methods should be more extensively employed for the purpose of bringing out more thoroughly their value.

6. Food and water, skin cleaning, the care of the bowels, the use of sedatives to calm anxiety and relieve pain, must all receive the closest attention.

Dr. S. J. Meltzer (New York), speaking of a case report on the subarachnoid use of magnesium sulfate, said death had been attributed to pulmonary edema. Yet, a report of thirty-two autopsies of cases that died of tetanus under no treatment, showed that twenty-six of the patients presented pulmonary edema. He stated that bacteriologists have reported the finding of several different strains of bacillus tetani, while the antitoxin being prepared is from still another strain, therefore of questionable utility. He stressed the fact that magnesium sulfate not alone gives a relatively low mortality from tetanus, but also gives greater relief from the pains of the disease than any other remedy.

Dr. A. J. Ochsner (Chicago) quoted Huntington as saying that in the Italian army the use of a prophylactic dose of ten times the supposed normal had reduced the mortality to one-tenth its previous figures. In his clinic, the use of large doses was the rule.

Dr. W. Estell Lee (Philadelphia) stressed the value of the serum for prophylaxis, quoting figures from the French army to show its very great usefulness.

Dr. Brooks recommended the giving of a prophylactic dose proportionate to the time elapsed since exposure to infection.

Dr. W. Estell Lee (Philadelphia) read a paper on "The Use of Dichloramin-T and Other Antiseptics in War Surgery" (lantern demonstration). He said all surgeons had agreed that in war wounds the indications are: (1) Surgical treatment at the earliest moment; (2) removal of foreign bodies; (3) removal of devitalized

tissue; (4) the use of a germicide that will not delay closure; (5) earliest possible closure.

Chlorine compounds have shown themselves superior to all others. Of these, he believed dichloramin-T to be the best, used as strong as 10 per cent strength in oil.

Slides were shown, illustrating by graphic curves the speed and duration of bacterial control by dichloramin-T.

Dr. Edward Ochsner (Chicago) said the error committed by surgeons was that of overlooking the fact that no one antiseptic is good against all bacteria; we must look for specifics in the case of individual organisms. He cited the specificity of phenol for staphylococcus pyogenes aurens, relating instances of its rapid curative effect in carbuncle. He deprecated the harm done useful measures by the overenthusiastic, mentioning Wright's vaccin method as an instance. In his opinion, the hypochlorone compounds are useful in saprophytic conditions only; of very little value in acute septic infections.

Dr. Frank G. Nifong (Columbia, Mo.) presented a paper on "The Hodgen Extension Suspension Splint and Its Exemplification in Both Civil and War Surgery." The essayist stressed the fact that the Hodgen splint affords the immobilization, extension, suspension, flexion and easy approach desirable in fractures of the long bones.

Dr. H. D. Wood (Arkansas) advocated the use of the word orthomelic (melos, a limb) instead of orthopedic.

"The Fall of the Alkaline Reserve Under Surgical Conditions; Its Effects and Prevention," was the title of a paper by Dr. H. W. Haggard, New Haven, Conn.

This paper followed the line of thought of Dr. Yandell Henderson, of Yale, who has presented the concept of shock as due to a diminished CO_2 content of the blood, brought about by rapid breathing (acapnia). The administration of CO_2, with the anesthetic to keep up its proper proportion in the blood, was among the preventive means suggested for shock.

In the afternoon and final session Dr. Geo. N. Kreider, of Springfield, Ill., read a paper on "Gastroptosis; Its Cause, Prevention and Cure, with Special Reference to the Duhet-Rovsing Operation." The writer enumerated bad habits of eating and drinking, deficient exercise, improper clothing, improper footwear, infections of teeth or air-passages as the cause. A large number of cases are cured by posture, proper eating, hygienic measures in general, and bandages.

In the small number not so relieved, the Rovsing technic of gastric fixation has given good results.

In the discussion that followed, the fact was brought out that, while in some cases raising the stomach level did good, in others this change might interfere with stomach-emptying by raising the pylorus too high.

Next followed a payer by Dr. Arthur C. Strachauer (Minneapolis), entitled "A New Principle in the Surgical Treatment of Brain Tumors." In this paper the fact was brought out that decompression may release the tumor, so that it will "point" coming to the surface, where it may be removed by reoperation.

The final paper of the section meeting was one on "Kondoleon's Operation," by Dr. Walter E. Sistrunk, Jr., of Rochester, Minn., formerly a Louisiana surgeon. Dr. Sistrunk's paper was well illustrated by slides of patients before and after treatment, as well as by others showing the technic of the operation and the pathology of the condition indicating it. He referred to the first paper on the subject in this country, that in which Dr. Rudolph Matas, of New Orleans, presented the subject to the Louisiana State Medical Society in 1913, quoting the latter as giving infection (often, repeated attacks of erysipelas) as the cause of the elephantiasis for which the operation is done. The author had modified the technic of Kondoleon—the excision of a deep fascia, through long incisions, in the limbs—by excising a correspondingly long strip of skin and superficial fascia, not so wide as the deep layer strip. This removes the excess of skin, that would otherwise lessen the cosmetic result. Seven cases have been operated on, with lasting improvement.

Dr. H. A. Royster, of North Carolina, gave the details of a case operated on by himself, previously reported.

Dr. Herman B. Gessner (New Orleans) referred to a case of his own, reported by Dr. Matas in the original American paper on this subject. This case, with two others, had all shown marked improvement; one involved the leg only; one, both legs and thigh; a third, the forearm. All had clear histories of infection, though not one had had erysipelas. In a recent conversation, Dr. Matas had told him of a total of six cases all bettered by interference, including the mother of a local hospital intern, whose close and continuous observation for a long time showed greatly relieved.

NEWS AND COMMENT

At a Recent Meeting of the Board of the Eye, Ear, Nose and Throat Hospital, Dr. Henry Dickson Bruns was elected chief surgeon to succeed the lamented de Roaldes, who occupied that position in the hospital since its inception. Dr. Bruns' long service and deep interest in the hospital, as surgeon in charge of the eye department, entitled him to the honor.

Dr. Jerome Landry has been appointed a house surgeon of Charity Hospital, to succeed Dr. W. H. Kostmayer, who resigned in order to assume charge of the Illinois Central Hospital.

National Tuberculosis Association Meeting.—The fourteenth annual meeting of the National Tuberculosis Association was held in Boston from June 6 to 8, under the presidency of Dr. Chas. L. Minor, Asheville, N. C. The following officers were elected: President, Dr. David R. Lyman, Wallingford, Conn.; honorary vice-president, Col. Geo. E. Bushnell, M. C., U. S. A.; vice-presidents, Dr. Lawrason Brown, Saranac Lake, N. Y., and Lee K. Frankel, New York City; secretary, Dr. Henry Barton Jacobs, Baltimore; treasurer, Dr. Wm. H. Baldwin, Washington, D. C. The association adopted resolutions deploring the retirement of Surgeon General Gorgas and requested that he be continued in active service in his present position, so that neither his work nor his plans may be interrupted.

American Medical Association Election of Officers.—At the sixty-ninth annual meeting of the American Medical Association, held in Chicago, June 10 to 14, the following officers were elected: President, Dr. Alexander Lambert, New York; first vice-president, Dr. Wm. N. Wishard, Indianapolis; second vice-president, Dr. E. Starr Judd, Rochester, Minn.; third vice-president, Dr. C. W. Richardson, Washington, D. C.; fourth vice-president, Dr. John M. Baldy, Philadelphia; secretary, Dr. Alexander R. Craig, Chicago; treasurer, Dr. Wm. Allen Pusey, Chicago; speaker of the House of Delegates, Dr. Hubert Work, Pueblo, Colo.; vice-speaker, Dr. Dwight H. Murray, Syracuse, N. Y.; members of the Board of Trustees, Drs. Frank H. Billings, Chicago; Wendell C. Phillips, New York; Thos. McDavitt, St. Paul, and Chester Brown, Danbury, Conn.; members of the Judicial Council, Drs. W. S. Thayer, Baltimore, and M. L. Harris, Chicago; members of the

Council on Health and Public Instruction, Drs. W. S. Rankin, Raleigh, N. C., and Ludvig Hektoen, Chicago.

Training School for Mental Hygiene Workers.—A war emergency course is being given at Smith College, Northampton, Mass., under the auspices of the National Committee for Mental Hygiene, to prepare workers to assist in reclaiming soldiers suffering from nervous and mental diseases. This course also will be given at the Boston Psycopathic Hospital. The work is under the direction of Miss Mary C. Jarrett, chief of social service at the hospital. The course will continue for more than eight months and will be open to college graduates and other young women who have had an equivalent of technical training. The academic portion of the instruction will be given at Smith College, to be followed by six months' practice work at various centers. Many eminent psychiatrists, psychologists and sociologists will be among the lecturers in the course.

New York's Lowest Infant Death Rate.—A survey of the infant death rate for 1917, showing a decline in infant mortality from 135.8 per thousand in 1907 to 88.8 in 1917, has been made by the New York Milk Committee. The improvement is attributed in part to the medical and educational campaigns, and partly to the efforts of the Milk Committee to improve the sanitary surroundings of infants.

Move to Militarize State Health Boards.—According to reports, the Surgeon General of the Army and his staff have given their approval to a plan for the federalization of all State and, perhaps, all municipal health organizations. A conference on the plans, all the details of which have not yet been worked out, was held in Washington on June 21.

Gastro-Enterologists Elect New Officers.—At the twenty-first annual meeting of the American Gastro-Enterological Association, held in Atlantic City, May 6 and 7, the following officers were elected: President, Dr. Walter A. Bastedo, New York City; vice-presidents, Drs. Thomas R. Brown, Baltimore, and Franklin W. White, Boston; secretary-treasurer, Dr. Frank Smithies, Chicago; recorder, Dr. Horace W. Soper, St. Louis.

Green Band for Whooping Cough.—The Health Department of Richmond, Va., has authorized the wearing of green arm-bands by children with whooping cough, with a view to preventing the spread of the disease. This will permit the children with the disease to get the fresh air. Rigid quarantine will be instituted in cases of refusal to use the green ribbons. Forty-four babies died in

Richmond last year from this one disease, and forty-six the previous year.

Free Antityphoid Inoculation.—The United States Public Health Service has been directed by Secretary McAdoo to give antityphoid inoculation without charge to all who apply to any of its hospitals or field offices. Applications may be made to any United States Marine Hospital, to any field office of the Public Health Service or to the United States Hygienic Laboratory, Washington, D. C. The United States Public Health Service, Washington, D. C., will furnish on application information as to the nearest place where an inoculation can be obtained.

Shortage of Labor in New York Hospitals.—The labor shortage, according to report, is so serious that many hospitals in New York are being obliged to curtail their work and some are looking forward to the possibility of being compelled to suspend work entirely. Appeal to the Federal authorities to institute measures of relief is under consideration by the Hospital Conference of the City of New York.

Wheat Obtained by Doctor's Prescription.—Texas having foregone the use of wheat flour, the Food Administration at Dallas, Texas, on the prescription of a physician, issued to him twelve pounds of wheat flour for a patient suffering from pernicious anemia.

Deaths From Dental Disorders.—The Metropolitan Life Insurance Company states that fifty-two deaths of policyholders in 1917 were traceable to infections of the teeth.

Badges for Medical Students.—Medical students who have been enrolled in the Medical Reserve Corps, subject to call at any time, have been given a badge to keep them from being looked upon as slackers. The badge is the same as the collar ornament worn by privates of the Medical Corps—a large, dark brass button bearing only the Medical Corps insignia, the Esculapian rod, and are worn at the button hole. Medical students in the Reserve Corps are subject to immediate call to the army if they fail in any studies.

The American Public Health Association will hold its next meeting in Chicago from October 14 to 17. The principal topic during the meeting will be "The Health of the Civil Population in War Time."

The American Laryngological Association, at its meeting in Atlantic City, May 29, elected the following officers: President Cornelius G. Coakley, New York; vice-presidents, Geo. E. Sham-

baugh, Chicago, and John R. Winslow, Baltimore; secretary, D. Bryson Delavan, New York; treasurer, J. Payson Clark, Boston; Councilors, Alexander W. McCoy, Philadelphia; Thos. R. French, Brooklyn; Jos. Goodale, Boston; Thos. H. Halstead, Syracuse.

HOMES OFFERED AS FIRST-AID HOSPITALS.—H. C. Frick, George J. Gould and S. Lewisohn have offered their New York City homes to the police department as first-aid hospitals in the event of air raids or other emergencies. This announcement came at a committee meeting of the emergency unit of Harlem, New York City, on June 25, which unit is composed of physicians who are training to be prepared to give aid in case of emergency and are instructing those desiring to take lessons in first-aid treatment.

YALE MEDICAL SCHOOL MEETS REQUIREMENTS.—Yale University Medical School has met the requirements of the General Education Board and the $2,500,000 endowment for the medical school is complete. As a part of its yearly income, the medical school will receive interest on the board's subscription of $582,900.

REMOVALS.—Dr. J. W. Kirby, from Charenton, La., to 721 St. Charles street, New Orleans, La.

Dr. T. J. Dimitry, from Maison Blanche Building to 3601 Prytania street, corner Foucher street, New Orleans, La.

PERSONALS.—Dr. Edward S. Hatch has returned from service in the army and has resumed his practice in the Maison Blanche Building.

Dr. Marcus Feingold is spending his vacation at Clifton Springs, New York, and will not return until September.

On June 30, 1918, Dr. Samuel Logan, aged 41 years, one of New Orleans' most prominent young practitioners.

DIED.—On July 1, 1918, Dr. A. B. Gaudet, prominent aurist of New Orleans, aged 44 years.

On July 2, 1918, Dr. Frank Kerr, of Jackson, Miss., aged 80 years.

BOOK REVIEWS AND NOTICES

An Introduction to the History of Medicine, by Fielding H. Garrison, A. B., M. D. Second edition. W. B. Saunders Company, Philadelphia and London.

The student of medicine constantly meets with references to men and times associated with the advancement of medical science. To find a ready reference, giving more or less definite information regarding both men and their periods, should be welcome. It has given us the same pleas-

ant task to scan the pages of this new edition as was afforded when the first edition came before us. The painstaking care in the arrangement and in the compilation of material should earn the praise and support of all students of medicine. As a foundaton for more complete records of modern medicine, this work is sure to serve a valued purpose. DYER.

Physical Diagnosis, by W. D. Rose, M. D. C. V. Mosby Company, St. Louis.

The author has prepared a most excellent guide to physical diagnosis, carefully planned and especially clear in detail. After establishing proper anatomical characteristics, each of the usual and unusual procedures in diagnosis are practically given, and with well-selected illustrations, elucidating a clear text. Topographic diagnosis is given, including even the conditions of the oral cavity, particular diseases and their special features, are given, with emphasis upon special characteristics of each. Altogether fulfilling the purpose for which the author has intended it—a comprehensive guide to physical diagnosis, with the practical demonstration of all methods and practices. DYER.

Medical War Manual No. 3. Military Ophthalmic Surgery, by G. E. De-Schweinitz, M. D., and Walter R. Parker, M. D.

Medical War Manual No. 4. Orthopedic Surgery, prepared by the Orthopedic Council. Lea & Febiger, Philadelphia and New York.

These two books, small in size and limited in scope, aim at presenting the conditions commonly met, and with indications for their relief. There is the evident purpose of presenting as much as possible in small space, and with practical methods, easy of acceptance and practice. The illustrations are few, but useful. DYER.

A Handbook of Antiseptics, by Henry Drysdale Dakin, D. Sc., F. I. C., F. R. S., and Edward Kellogg Dunham, M. D. The MacMillan Company, New York.

The authors state that the main object of this little book is to give a concise account of the chief chemical antiseptics which have been found useful for surgical purposes during the present war. A brief, but good review is afforded of the chlorine group of antiseptics, of the phenol group, and of a miscellaneous lot of antiseptics of various forms and uses. Morison's paste of bismuth, iodoform and paraffin oil are especially noted in this last group. In separate chapters, methods of testing antiseptics, the disinfection of carriers and the disinfection of water are discussed. The book is of hand-size, and, with its content dealing with many or most of the new antiseptics, it is sure to serve a useful purpose. DYER.

Long Heads and Round Heads, by Wm. S. Sadler, M. D. A. C. McClurg & Co., Chicago, 1918.

Dr. Sadler has written in order to help his fellow-Americans to understand the present conflict. He studies the prehistoric races and their evolution, gradually getting down to three distinct species—the Nordic, the Mediterranean, and the Alpine. The first two are long-skulled, the last are round-skulled. The leaders, or militarists in Germany, are Nordic, while the masses are Alpine. Finally, it is the Nordic egotism of the chiefs, joined to the Alpine stupidity of the masses, which furnishes the formula of the German people of to-day. When the inherent tendency of the Nordic element to enter upon conquest is joined to the inherent tendency of the Alpine stock toward comparative stupidity and brutality,

the combination brings about the reign of frightfulness, and we can understand the situation among the Germans.

The writer emphasizes the frequently reiterated statement that Germany is a menace to civilization, and closes with twenty-five good reasons why we must win the war.

The entire book is interesting and well worth reading. C. C.

PUBLICATIONS RECEIVED

THE YEAR BOOK PUBLISHERS, Chicago, 1918.

The Practical Medicine Series. Volume I: **General Surgery,** edited by Albert J. Ochsner, M. D., F. R. M. S., LL. D., F. A. C. S. Volume II: **General Medicine,** edited by Frank Billings, M. S., M. D., assisted by Burrell O. Raulston, A. B., M. D.

THE MACMILLAN COMPANY, New York, 1918.

Reclaiming the Maimed, by R. Tait McKenzie, M. D.

Infection and Resistance, by Hans Zinsser, M. D. Second edition, revised.

F. A. DAVIS COMPANY, Philadelphia, 1918.

The Ungeared Mind, by Robert Howland Chase, A. M., M. D.

WASHINGTON GOVERNMENT PRINTING OFFICE, Washington, D. C., 1918.

Public Health Reports. Volume 33, Nos. 22, 23, 24, 25 and 26.

Report of the Department of Health of the Panama Canal. January, February and March, 1918.

Service and Regulatory Announcements. Supplement. (United States Department of Agriculture, Bureau of Chemistry.)

Report of the Chairman of the Committee on Medicine and Sanitation of the Advisory Committee of the Council of National Defense. April 1, 1918.

MISCELLANEOUS:

Japanese Medical Literature. A Review of Current Periodicals. Vol. III, No. 2. (China Medical Journal, Shanghai, China.)

Annual Report of the Bulletin of Surgery. 1917. (Wm. Ellis Jones' Sons, printers, Richmond, Va.)

The Medical Report of the Rice Expedition to Brazil, by W. T. Councilman, M. D., and R. A. Lambert, M. D. (Cambridge Press, Cambridge, Mass.)

REPRINTS.

Malignant Diphtheria Treated by Massive Doses of Antitoxin Given Intraperitoneally, by George Heustis Fondé, M. D.

Sisyrinchium Bermudiana, by Oliver Atkins Farwell.

Reflections on Vaccinetherapy from the Viewpoint of the Practical Clinician, by G. H. Fondée, M. D.

A Simple Method of Water Purification for Itinerant Missionaries and Other Travelers, by R. G. Mills, M. D.; A. I. Ludlow, M. D., and J. D. Van Buskirk, M. D.

MORTUARY REPORT OF NEW ORLEANS.

Computed from the Monthly Report of the Board of Health of the City of New Orleans, for June, 1918.

CAUSE.	White.	Colored.	Total.
Typhoid Fever	6	4	10
Intermittent Fever (Malarial Cachexia)	------	1	1
Smallpox	------	------	------
Measles	4	------	4
Scarlet Fever	------	------	------
Whooping Cough	7	2	9
Diphtheria and Croup	2	------	2
Influenza	1	2	3
Cholera Nostras	------	------	------
Pyemia and Septicemia	------	------	------
Tuberculosis	55	40	95
Cancer	24	14	38
Rheumatism and Gout	3	1	4
Diabetes	4	------	4
Alcoholism	2	------	2
Encephalitis and Meningitis	4	1	5
Locomotor Ataxia	1	------	1
Congestion, Hemorrhage and Softening of Brain	25	7	32
Paralysis	5	1	6
Convulsions of Infancy	------	------	------
Other Diseases of Infancy	10	7	17
Tetanus	------	------	------
Other Nervous Diseases	7	1	8
Heart Diseases	64	49	113
Bronchitis	1	2	3
Pneumonia and Broncho-Pneumonia	8	16	24
Other Respiratory Diseases	4	3	7
Ulcer of Stomach	1	3	4
Other Diseases of the Stomach	1	------	1
Diarrhea, Dysentery and Enteritis	30	20	50
Hernia, Intestinal Obstruction	2	4	6
Cirrhosis of Liver	7	4	11
Other Diseases of the Liver	5	2	7
Simple Peritonitis	------	1	1
Appendicitis	9	5	14
Bright's Disease	24	24	48
Other Genito-Urinary Diseases	10	11	21
Puerperal Diseases	3	4	7
Senile Debility	1	1	2
Suicide	3	------	3
Injuries	19	15	34
All Other Causes	30	30	60
TOTAL	382	275	657

Still-born Children—White, 28; colored, 20; total, 48.

Population of City (estimated)—White, 276,000; colored, 102,000; total, 378,000.

Death Rate per 1000 per annum for Month—White, 16.37; colored, 31.73; total, 20.53. Non-residents excluded, 17.87.

METEOROLOGIC SUMMARY (U. S. Weather Bureau).

Mean atmospheric pressure. 29.95
Mean temperature. . . . . 83.
Total precipitation. . . . . 2.45 inches
Prevailing direction of wind, Southwest.